

# Development and Resilience

## Re-thinking poverty and intervention in biocultural landscapes

L. Jamila Haider

Academic dissertation for the Degree of Doctor of Philosophy in Sustainability Science at Stockholm University to be publicly defended on Friday 29 September 2017 at 10.00 in Vivi Täckholmsalen (Q-salen), NPQ-huset, Svante Arrhenius väg 20.

### Abstract

The practices related to the growing, harvesting, preparation, and celebration of food over millennia have given rise to diverse biocultural landscapes the world over. These landscapes – rich in biological and cultural diversity – are often characterised by persistent poverty, and, as such, are often the target of development interventions. Yet a lack of understanding of the interdependencies between human well-being, nature, and culture in these landscapes means that such interventions are often unsuccessful - and can even have adverse effects, exacerbating the poverty they were designed to address. This thesis investigates different conceptualisations of persistent poverty in rural biocultural landscapes, the consequences of these conceptualisations, and the ways in which development interventions can benefit from, rather than erode, biocultural diversity.

The thesis first reviews conceptualisations of persistent poverty and specifically, the notion of a poverty trap (**Paper I**), and examines the consequences of different conceptualisations of traps for efforts to alleviate poverty (**Paper II**). **Paper I** argues that the trap concept can be usefully broadened beyond a dominant development economics perspective to incorporate critical interdependencies between humans and nature. **Paper II** uses multi-dimensional dynamical systems models to show how nature and culture can be impacted by different development interventions, and, in turn, how the degradation of both can undermine the effectiveness of conventional poverty alleviation strategies in certain contexts.

In the second section, the thesis focuses on the effects of, and responses to, trap-like situations and development interventions in a specific context of high biocultural diversity: the Pamir Mountains of Tajikistan. **Paper III** advances a typology of responses to traps based around the mismatch of desires, abilities and opportunities. Observing daily practice provides a way to study social-ecological relationships as a dynamic process, as practices can embody traditional and tacit knowledge in a holistic way. **Paper IV** examines the diverse effects of a development intervention on the coevolution of biocultural landscapes and the ways in which everyday practice – particularly around food – can be a source of both innovation and resilience.

**Papers I-IV** together combine insights from diverse disciplines and methodologies, from systematic review to dynamic systems thinking and participant observation. **Paper V** provides a critical analysis of the opportunities and challenges involved in pursuing such an approach in sustainability science, underscoring the need to balance methodological groundedness with epistemological agility.

Overall, the thesis contributes to understanding resilience and development, highlighting the value of viewing their interrelation as a dynamic, coevolving process. From this perspective, development should not be regarded as a normative endpoint to be achieved, but rather as a coevolving process between constantly changing ecological and social contexts. The thesis proposes that resilience can be interpreted as the active and passive filtering of practices via the constant discarding and retention of old and new, social and ecological, and endogenous and exogenous factors. This interpretation deepens understanding of resilience as the capacity to persist, adapt and transform, and ultimately shape new development pathways. The thesis also illustrates how daily practices, such as the growing, harvesting, and preparation of food, offer a powerful heuristic device for understanding this filtering process, and therefore the on-going impact of development interventions in rural landscapes across the world.

**Keywords:** *biocultural diversity, coevolution, development, interdisciplinary, Pamir Mountains, poverty traps, resilience, social-ecological systems.*

Stockholm 2017

<http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-145665>

ISBN 978-91-7649-909-2  
ISBN 978-91-7649-910-8

Stockholm Resilience Centre

Stockholm University, 106 91 Stockholm





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ISBN print 978-91-7649-909-2

ISBN PDF 978-91-7649-910-8

Printed in Sweden by Universitetsservice US-AB Stockholm 2017

Distributor: Stockholm Resilience Centre

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Cover image: Doctor Shirinbek tends to his fields in the Pamir Mountains. Photo by: Jamila Haider

To Papa,  
The mirror of my thoughts,  
always.



# Abstract

The practices related to the growing, harvesting, preparation, and celebration of food over millennia have given rise to diverse biocultural landscapes the world over. These landscapes – rich in biological and cultural diversity – are often characterised by persistent poverty, and, as such, are often the target of development interventions. Yet a lack of understanding of the interdependencies between human well-being, nature, and culture in these landscapes means that such interventions are often unsuccessful - and can even have adverse effects, exacerbating the poverty they were designed to address. This thesis investigates different conceptualisations of persistent poverty in rural biocultural landscapes, the consequences of these conceptualisations, and the ways in which development interventions can benefit from, rather than erode, biocultural diversity.

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Overall, the thesis contributes to understanding resilience and development, highlighting the value of viewing their interrelation as a dynamic, coevolving process. From this perspective, development should not be regarded as a normative endpoint to be achieved, but rather as a coevolving process between constantly changing ecological and social contexts. The thesis proposes that resilience can be interpreted as the active and passive filtering of practices via the constant discarding and retention of old and new, social and ecological, and endogenous and exogenous factors. This interpretation deepens understanding of resilience as the capacity to persist, adapt and transform, and ultimately shape new development pathways. The thesis also illustrates how daily practices, such as the growing, harvesting, and preparation of food, offer a powerful heuristic device for understanding this filtering process, and therefore the on-going impact of development interventions in rural landscapes across the world.

**Keywords:** biocultural diversity, coevolution, development, interdisciplinary, Pamir Mountains, poverty traps, resilience, social-ecological systems

# Sammanfattning

De metoder inom odling, skörd, tillagning och firande av mat som över årtusenden valts ut av människor har givit upphov till många variationer av biokulturella landskap världen över. Områden med riklig biologisk och kulturell mångfald kännetecknas emellertid ofta av bestående fattigdom och kan därmed bli aktuella för olika utvecklingsinsatser. Fast genomförs sådana insatser utan hänsyn till det ömsesidiga beroendeförhållandet mellan människors välbefinnande, kultur och miljö i ett specifikt landskap riskerar insatsen att bli fruktlös. Insatsen kan till och med få motsatt effekt. I föreliggande avhandling undersöks olika konceptualiseringar av bestående fattigdom i landsbygdsområden och konsekvenser av dessa, samt olika sätt som utvecklingsinsatser kan dra nytta av, snarare än att erodera, biokulturell mångfald.

Avhandlingen inleds med en genomgång av olika konceptualiseringar av bestående fattigdom, i synnerhet i relation till begreppet 'fattigdomsfälla' (*poverty trap*) (**artikel I**), och undersöker konsekvenser av sådana kopplat till olika insatser för att stoppa fattigdom (**artikel II**). I **artikel I** argumenteras att konceptet fattigdomsfälla kan breddas och bli användbart bortom ett utvecklingsekonomiskt synsätt och då för att synliggöra de fundamentala beroendeförhållandena mellan människor och natur. I **artikel II** används dynamiska systemmodeller för att visa hur natur och kultur kan påverkas av olika utvecklingsinsatser och hur eroderingar inom båda dessa områden i vissa kontexter kan undergräva effektiviteten av konventionella strategier för fattigdomsbekämpning.

I den andra delen fokuseras på effekter och hantering av fälla-liknande situationer i relation till utvecklingsinsatser inom en specifik kontext av hög biokulturell mångfald, nämligen i Tadzjikistans Pamir-bergslandskap. **Artikel III** tillhandahåller en översikt över olika svar på fattigdomsfällor baserat på hur olika önskemål, förmågor och möjligheter sammanfaller eller ej. Genom att observera vardagliga levnadssätt är det möjligt att studera social-ekologiska relationer som en dynamisk process, och därmed synliggöra underförstådd och tillsynes självfallen kunskap på ett holistiskt sätt. **Artikel IV** skildrar exempel på hur vardagliga handlingar, särskilt relaterat till mat, är en källa till både innovation och resiliens. Framgångsrika metoder samevolutionerar och kan resultera i ritualer, vilka i sin tur

förstärker praxis och blir till en källa av social-ekologiskt minne och resiliens.

**Artikel I-IV** kombinerar insikter från olika discipliner och metoder, från systematisk granskning till dynamiskt systemtänk och deltagarobservation. **Artikel V** tillhandahåller en kritisk analys av utmaningar med ett sådant tillvägagångsätt inom hållbarhetsforskning, med ett särskilt fokus på balansen mellan metodologisk förankring och epistemologisk smidighet.

I det stora hela bidrar föreliggande avhandling till det framväxande resiliens- och utvecklingsfältet. Detta genom att belysa värdet av att hantera utveckling och resiliens som dynamiska och samevolutionerande processer. Utifrån ett sådant perspektiv ska inte utveckling betraktas som ett normativt slutmål att uppnå, utan som en process av samevolution mellan ständigt föränderliga ekologiska och sociala kontexter. Avhandlingen förordar att samevolutionsprocesser och den ständigt föränderliga resiliensen i ett biokulturellt landskap (som manifesterar sig genom dess förmåga att bestå, anpassa och förändras i en föränderlig utvecklingskontext) kan förstås som en filtreringsprocess som kan peka på vilka exogena och endogena resurser som bör frångås eller behållas. Avhandlingen illustrerar hur vardagliga handlingar, såsom odling, skörd och matlagning, erbjuder en kraftfull heuristik som kan hjälpa oss förstå sådana filtreringsprocesser och därmed effekter av olika utvecklingsinsatser.

**Nyckelord:** biokulturell mångfald, samevolution, utveckling, tvärvetenskaplig, Pamir, fattigdomsfällor, resiliens, social-ekologiska system

# Абстракт

Тухмиҳо ва таҷрибаҳои, ки тули ҳазорсолаҳо аз ҷониби мардум интиҳоб ва истифода шудаанд, ба фарогирии фароғатгоҳҳои гуногуни агроэкологӣ дар саросари ҷаҳон оварда мерасонанд. Вале минтақаҳои, ки фарҳанг ва биологияи ғаний доранд, гуногунсозӣҳои биологӣ аксаран аз сабаби камбизоатӣ тавсиф карда мешаванд, аз ин рӯ, тавассути барномаҳои инкишоф ба марра гирифта мешаванд. Аммо набудани фаҳмиши алоқамандии мутақобилаи байни некӯахлоқии инсон, фарҳанг ва табиат дар ин манзара маъноӣ онро дорад, ки ин гуна барномаҳо аксар вақт ногузиранд ва ҳатто метавонанд таъсири манфӣ дошта бошанд. Кори илмӣ мазкур, мафҳумсозӣҳои гуногуни камбизоатии давомдор дар манзараҳои дехот, пайомадҳои он ва роҳҳои, ки дар он муҳофизатҳои инкишоф метавонанд аз гуногунии биофарҳангӣ, ба ҷои таниш истифода карда мешаванд, мавриди баррасӣ қарор мегирад.

Кори илмӣ мазкур аввалин тавсифоти камбизоатии доимӣ ва махсусан, дар бораи доираи доманаи камбизоатӣ (Мақолаи I) ва оқибатҳои ин мафҳумҳо барои кӯшишҳои паст кардани сатҳи камбизоатӣ (Мақолаи II)-ро шарҳ медиҳад. Мақолаи I – и ҳуҷҷати мандалел меорад, ки концепсияи доманаи фақр метавон берун аз дурнамои иқтисодии рушд барои муттаҳид сохтани алоқамандии ҳамҷониби байни одамон ва табиат муфидтар истифода бурда шуда метавонад. Мақолаи II моделҳои системаҳои динамикиро истифода мебарад, то нишон диҳад, ки ҷӣ гуна табиат ва фарҳанг метавонад тавассути барномаҳои гуногуни инкишоф таъсир расонида метавонанд ва дар навбати худ, ҷӣ гуна таназзули ҳам дучониба самаранокии стратегияҳои коҳиш додани сатҳи камбизоатӣ дар баъзе заминаҳо метавонад заиф гардад.

Дар қисмати дуюм, дар назарсанҷӣ диққати худро ба таъсири манфӣ ва ҷавобҳо, ҳолатҳои таъриқӣ ва даҳолати рушд дар заминаи мушаххаси фарогирии биофарҳангии баланд: кӯҳҳои Помир дар Тоҷикистон диққат медиҳад. Мақолаи III ба навъҳои таблиғи ҷавобҳо ба доманаҳо асос ёфтааст, ки дар доираи норасоӣҳои хоҳишҳо, қобилиятҳо ва имкониятҳо мавҷуданд. Насб кардани таҷрибаи ҳаррӯза роҳи омӯхтани муносибатҳои иҷтимоӣ экологӣ ҳамчун раванди динамикӣ мебошад, зеро он ба таври ҳамҷониби донишу маърифат ва дониши ҳаматарафа

мебошад. Мақолаи IV-и намунаи таҷрибаи ҳаррӯза - махсусан дар атрофи ғизо - манбаи навоарӣ ва устуворӣ мебошад. Амалҳои бомуваффақият якҷоя амал мекунад ва расмҳои таблиғотӣ дар навбати худ таҷрибахоро тақвият мебахшанд ва сарчашмаи хотираи иҷтимоиву экологӣ мебошанд.

Мақолаҳои I-IV омилҳо аз усулҳои гуногун ва методологияҳо, аз тафсири системавӣ ба тафаккури динамикӣ ва мушоҳидаи иштирокӣ иборатанд. Мақолаи V таҳлили муҳтавои мушкилоте, ки дар рафти чунин муносибат дар соҳаи устувории илм, махсусан чӣ гуна тавозуни методологӣ бо қувваи эпидемиологиро дар бар мегирад.

Умуман, дар назар аст, ки тезис ба соҳаи тараққиёти устувор ва рушд мусоидат мекунад, ки арзиши дидани ҳам инкишоф ва ҳам қобилиятнокӣ ҳамчун равандҳои динамикӣ ва ҳамохангшуда мебошад. Аз ин нуқтаи назар, рушд набояд ҳамчун нуқтаи ниҳой ба даст оварда шавад, балки ҳамчун раванди мутобиқат байни мунтазам тағйироти экологӣ ва иҷтимоӣ бошад. Тадема пешниҳод мекунад, ки ин раванди мутобиқат ва тағйирёбии доимии фазои биохимиявии тағйирёбандаи доими, мутобиқшаванда ва тағйирёбанда дар шароити тағйирёбии рушд - метавонад ҳамчун раванди филтетонӣ барои муайян кардани он, ки эко захираҳои энергетикӣ партофта шудаанд ё нигоҳ дошта мешаванд. Тадеҳ тасаввур мекунад, ки чӣ тавр таҷрибаи ҳаррӯза, аз қабилӣ парвариши, чамъоварӣ ва тайёр кардани ғизо, барои фаҳмидани раванди филтатсия ва аз ин рӯ, таъсири барномаҳои рушд пешниҳод менамояд.

**Калимаҳои калидӣ:** қобилият, рушд, табақаҳои камбизоатӣ, чудой, гуногунии биохимиявӣ, системаҳои иҷтимоию экологӣ, дискҳои муосир, кӯҳҳои Помир

# Zusammenfassung

Die Praktiken im Zusammenhang mit dem Anbau, der Ernte, der Zubereitung und der Feier von Essen, die während Jahrtausenden von Völkern ausgewählt wurden, haben weltweit vielgestaltige agroökologische Landschaften entstehen lassen. Indes sind diese in biologischer und kultureller Diversität reichen Regionen oft durch anhaltende Armut gekennzeichnet und daher Ziel von Entwicklungsmaßnahmen. Das mangelnde Verständnis von Wechselwirkungen zwischen dem Wohlergehen der Menschen, der Kultur und der Natur in diesen Landschaften bewirkt, dass solche Entwicklungsinterventionen häufig nicht erfolgreich sind oder sogar gegenteilige Effekte haben können. Diese Doktorarbeit untersucht verschiedene Konzeptualisierungen von anhaltender Armut in ländlichen Gebieten, deren Konsequenzen und die Art und Weise, wie Entwicklungsinterventionen von biokultureller Diversität profitieren können statt diese auszuhöhlen.

Am Anfang arbeitet diese Doktorarbeit die Konzeptualisierungen von anhaltender Armut auf, im Besonderen den Begriff der Armutsfalle (Papier I). Weiter werden die Folgen dieser Konzeptualisierungen für die Bemühungen zur Armutsbekämpfung untersucht (Papier II). Papier I diskutiert, dass das Konzept der Armutsfalle sinnvoll über eine entwicklungsökonomische Perspektive hinaus erweitert werden kann, um die kritischen Wechselwirkungen zwischen Mensch und Natur zu berücksichtigen. Papier II zeigt mit multidimensionaler dynamischer Systemmodellierung, wie Natur und Kultur von verschiedenen Entwicklungsinterventionen betroffen sein können, und wie im Gegenzug die Degradierung beider die Effektivität konventioneller Strategien zur Armutsbekämpfung in bestimmten Kontexten untergraben kann.

Im zweiten Abschnitt konzentriert sich diese Doktorarbeit auf das Zusammenwirken von armutsfallenähnlichen Situationen und Entwicklungsinterventionen in einem spezifischen Kontext von hoher biokultureller Diversität: dem Pamir-Gebirge in Tadjikistan. Papier III entwickelt eine Topologie von Antworten auf Armutsfallen, die sich aus der Diskrepanz von Wünschen, Fähigkeiten und Chancen ergeben. Die Beobachtung der alltäglichen Praxis ermöglicht die Untersuchung sozio-ökologischer Zusammenhänge als dynamischen Prozess, da diese das

implizite und angeborene Wissen in ganzheitlicher Form verkörpert. Papier IV gibt Beispiele dafür, dass die alltägliche Praxis - insbesondere rund um das Essen - sowohl eine Quelle von Innovation als auch von Resilienz ist. Erfolgreiche Praktiken entwickeln sich koevolutionär und werden zu Ritualen, die im Gegenzug die Praktiken verstärken und zu einer Quelle des sozio-ökologischen Gedächtnisses und der Resilienz werden.

Die Papiere I-IV vereinigen Erkenntnisse aus verschiedenen Disziplinen und basierend auf verschiedenen Methodologien, von einer systematischen Literaturübersicht über das Denken in dynamischen Systemen bis hin zur teilnehmenden Beobachtung. Papier V bietet eine kritische Analyse der Herausforderungen eines solchen Ansatzes in der Nachhaltigkeitswissenschaft.

Insgesamt trägt diese Doktorarbeit zum aufstrebenden Fachgebiet von Resilienz und Entwicklung bei, indem der Wert der Betrachtung sowohl von Entwicklung als auch von Resilienz als dynamische, koevolutionäre Prozesse hervorgehoben wird. Aus dieser Perspektive sollte Entwicklung nicht als ein zu erreichender normativer Endpunkt betrachtet werden, sondern vielmehr als ein Prozess der Koevolution unter sich ständig ändernden ökologischen und sozialen Kontexten. Diese Arbeit schlägt vor, dass dieser Prozess der Koevolution und somit die sich ständig ändernde Resilienz einer bio-kulturellen Landschaft, als ein Filterprozess interpretiert werden kann der ermittelt, welche exogenen und endogenen Ressourcen verworfen oder bewahrt werden. Diese Doktorarbeit illustriert zudem, wie die tägliche Praxis des Anbaus, der Ernte und der Zubereitung von Nahrungsmitteln/von Essen eine wirkungsvolle heuristische Methode darstellt, um diesen Filterprozess und damit die Auswirkung von Entwicklungsinterventionen zu verstehen.

**Schlüsselwörter:** biokulturelle Diversität, Koevolution, Entwicklung, Armutfallen, interdisziplinär, Pamir-Gebirge, Resilienz, sozio-ökologische Systeme

# List of Papers

- I. **Haider, L.J.**, Boonstra, W.J., Peterson, G.D. and Schlüter, M. *In press*. Traps and Sustainable Development in Rural Areas: A review. *World Development*. DOI 10.1016/j.worlddev.2017.05.038
- II. Lade\*, S.J. **Haider\***, **L.J.**, Engström, G. and Schlüter, M. 2017. Resilience offers escape from trapped thinking on poverty alleviation. *Science Advances*. 3(5) e1603043.  
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- III. Boonstra, W.J., Bjorkvik, E., **Haider, L.J.** and Masterson, V. 2016. Human responses to social-ecological traps. *Sustainability Science* 11:6, 811. DOI 10.1007/s11625-016-0397-x
- IV. **Haider, L.J.**, Akorbirshoeva, A., Boonstra, W.J. and Schlüter, M. The effects of development interventions on coevolved practices in biocultural landscapes. *Manuscript*.
- V. **Haider, L.J.**, Hentati-Sundberg, J., Giusti, M., Goodness, J., Hamman, M., Masterson, V., Meacham, M., Merrie, A., Ospina, D., Schill, C., and Sinare, H. *In press*. The undisciplined journey: Early-career perspective in sustainability science. *Sustainability Science*. DOI 10.1007/s11625-017-0445-1

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## Contributions:

For paper I, I conceived and designed the research with inputs from co-authors. I collected and analysed the data, led the writing process and wrote the majority of the text with inputs from co-authors. In paper II, I jointly conceived and designed the research. I reviewed the literature and jointly with SJL analysed the results and co-led the writing. In paper III, I jointly contributed to the theoretical development of the paper and contributed equally to the comparative case study research. I wrote the Pamir case section and contributed to the writing of the rest of the paper. For paper IV, I conceived and designed the research with input from co-authors. I conducted the fieldwork and analysis, and I wrote the paper with comments from co-authors. Paper V was jointly conceived and designed with co-authors, as was data collection and analysis. I led the writing process.

## RELEVANT ADDITIONAL PUBLICATIONS (referred to in Kappa)

### [Book]

- A. van Oudenhoven, F. and **Haider J.** 2015. *With Our Own Hands: A Celebration of Life and Food in the Pamir Mountains of Afghanistan and Tajikistan*. LM Publishers: Utrecht, Netherlands.

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- D. **Haider, L.J.** and Boonstra, W.J. 2017. Social-ecological farming as a middle-ground solution to a polarized debate. *Solutions* (8):1.

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- F. **Haider, L.J.** and van Oudenhoven, F.J.W. 2015. Seeds and Ideas: Food as a method in development practice. Oxfam Novib, Hivos: Netherlands. (Published as Oxfam & Hivos report)

### [In progress]

- G. Schlüter, M., **Haider, L.J.**, Lade, S., Lindkvist, E., Martin, R., Orach, K., Wijermans, N., and Folke, C. Explaining change in complex adaptive social-ecological systems – An action-situation based framework. *In preparation*.

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# Prologue

The questions I ask in this thesis have been with me for a long time. As long as I can remember, I grew up with the ‘will to improve.’ The genesis of the ideas in their current form stem from my relationship with the Pamir Mountains of Central Asia.

The Pamirs hold in tension many opposites: scarcity and abundance, diversity and unity, poverty and richness, hope and despair. The positives were shown to me by the women of the Pamirs who opened their hearts and hearths to cook together, to help me understand their landscape and life through their own hands.

The depth of the blue sky framed by mountain peaks, snow-covered all year round. Some of the world’s largest glaciers give way to ingenious water channels built into vertiginous mountainsides, providing sustenance to the patchwork of fields yielding crops found nowhere else in the world. The crops in turn are tended through song, prayer, and ritual, by famously hospitable people who hold a deep and rich oral tradition of hitherto unwritten languages.

But for all this romance, the Pamirs are undergoing a period of immense change. As the most remittance-heavy region in the world, few people remain to tend the soils. The Tajik Pamirs are the poorest area of Central Asia, and the worst human development indicators ever recorded preside on the Afghan side of the Pamir Mountains.

I worked here as a development practitioner – with the will to improve.

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As a development practitioner in the Pamirs my job was to address identified problems and to implement solutions.

The problem was hunger, so we brought improved seed varieties and fertilisers with the promise of higher productivity.

The problem was a lack of diversified incomes, so we introduced marketable varieties of fruit crops.

The problem was loss of local heritage, so we hosted festivals and opened tourist boutiques to sell handicrafts.

There seemed to be a missing link. The creation and maintenance of landscape and culture was becoming increasingly disconnected from the will to improve, to develop. I watched as improved seed varieties and fertilisers were introduced with the aim to increase production, replacing ancient local seed varieties. Disappearing alongside the declining agricultural biodiversity, were the words, rituals and practices that created it.

Amid growing unrest and security threats in the region, I asked myself a difficult question: what is 'this' all for? 'This,' being the machinery of international development, working for decades in the region to improve livelihoods. It felt to me that projects continued to operate almost on their own will, fuelled by the good will of thousands of individuals, who genuinely want to improve peoples lives.

'This' is development.

Yet somehow, when [good]will is translated to implementable and monitorable plans, the systemic nature of that will is cut into pieces. It is prioritized and scaled, into outcomes, outputs, activities and indicators.

The result is a fragmented piecemeal of will. Good. Actions. For: Health. Sustainability. Environment. Productivity. Sometimes even heritage.

This is not to say that development doesn't have impact – it does. But the impact of development is based on the way that problems are framed and conceptualised. The questions I seek to answer in this thesis are: What the effects of this impact are on the biological and cultural diversity that exist in a place, and how do people respond to it? How do the ways we conceptualise poverty-environment relationships define the ways in which poverty alleviation interventions take place?

I left my job in international development, but I had to return to the Pamirs; this time as a researcher with the will to understand and to seek answers to some of these questions. It's the kind of place that captures your heart and your mind and stays with you forever.

# Introduction – Persistent poverty in areas of high biocultural diversity

Over millennia the rugged, rocky, inhospitable landscape of the Pamir Mountains was transformed into fertile patches of soil through human ingenuity. People tended to the land, and domesticated wild, hearty varieties of grains and fruits. The niche environments created at altitudes between 2,000 to 4,000 metres gave rise to an enormous diversity of agricultural crops. Cultural and spiritual practices, languages, and values have coevolved with the changing landscape. These practices sustain and continue to create the rich biological and cultural (biocultural) diversity of the Pamirs. Biocultural refers to the coevolution of biological and cultural diversity, tightly bounded in a place (Loh and Harmon 2005; Maffi 2005; 2012; Gavin et al. 2015). Dr. Shirinbek (*on the cover*), a surgeon trained during the time of the Soviet Union, domesticates medicinal plants close to his home via a process of trial and error. He selects the strongest plants each year and saves their seeds. Without access to pharmaceutical medicines after the collapse of the Soviet Union, Dr. Shininbek began to treat his patients from the landscape around his home – recalling the knowledge of his ancestors on how to use these plants to heal people, contributing to the rich biocultural tapestry of the Pamirs.

Despite its biocultural wealth, the Pamir region remains impoverished in economic terms. Tajik citizens are poorer than citizens of other Post-Soviet states with a gross national income per capita of 2,601 USD in 2016<sup>1</sup> (UNDP 2016). Tajikistan suffers from high levels of malnutrition, with 32 per cent of children under five suffering from chronic malnutrition and over 99 per cent of women have some degree of anaemia (AKF-T 2008). In addition, more than half the families in Tajikistan have family members working abroad (Danzer et al. 2013), making it the most remittance-dependent nation in the world (over 50 per cent of the GDP is made up of remittances (World Bank 2014)).<sup>2</sup>

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<sup>1</sup> GNI figures are for Tajikistan as a whole, breakdown for Pamirs unavailable (though the Pamirs are widely known to be the poorest area of Tajikistan, and indeed central Asia as a whole (Middleton, 2016).

<sup>2</sup> Remittance figures for 2015 onwards are thought to be falling (World Bank 2016a).

The impoverished status of Tajikistan, and the Pamir region in particular, have made it a priority area for development interventions since the fall of the Soviet Union, and the ensuing Tajik civil war from 1992-1997 (Middleton 2016). However, conventional interventions to alleviate poverty, which focus on increasing agricultural production and improving market access and infrastructure, often do so at the expense of the very biocultural diversity that may play a central role in a region's adaptive and transformative capacity (Dearden 1995), whilst at the same time failing to alleviate the poverty they set out to address (Fischer and Hajdu 2015). While the multi-faceted and dynamic nature of poverty is increasingly recognized, mainstream concepts of persistent poverty, such as poverty traps, still fail to take into account the interdependence between humans and nature that shapes everyday local practices. Moreover, there is a lack of understanding of how these coevolved practices are affected by development interventions, and the role of practice as a source of resilience.

The central motivation of this thesis is to better understand how development processes (specifically poverty alleviation) in biocultural landscapes can occur without the concomitant reduction of biocultural diversity, and how development processes in turn are influenced, and potentially supported by, biocultural diversity itself. Two main knowledge gaps obstruct, or even reinforce, the lack of a better understanding.

The first knowledge gap relates to our understanding of how different conceptualisations of poverty influence its alleviation (Green and Hulme 2005). Conceptualisations of persistent poverty have been commonly defined in economic terms as a poverty trap and there is a lack of integrated understanding of traps as created by, and in turn influencing, social-ecological dynamics. Traps are commonly defined as a self-reinforcing situation of poverty under a given asset threshold (Azariadis and Stachurski 2004; Barrett and Swallow 2006; Bowles et al. 2006). Despite broad recognition that poverty is multi-dimensional (Alkire 2007; Alkire and Santos 2010; UNDP 2016), the poverty trap model as used in development economics has thus far failed to incorporate dynamics beyond thresholds of economic well-being (Barrett and Constanas 2014). If poverty is conceptualised as a self-reinforcing undesirable state under an economic threshold, the purported solutions will focus on overcoming that economic threshold, through for example, 'big-push' style interventions (Easterly 2006), and ignore external multi-scale factors (Rudel et al. 2013). Under some conditions, big-push interventions may be successful (e.g. Wanjala and Muradian 2013 for household level; Collier 2006 for national level examples). Often however, exogenous big-push interventions have adverse effects on nature and culture and can therefore reinforce rather than alleviate the problem (Figure 1; Ngonghala et al. 2017).

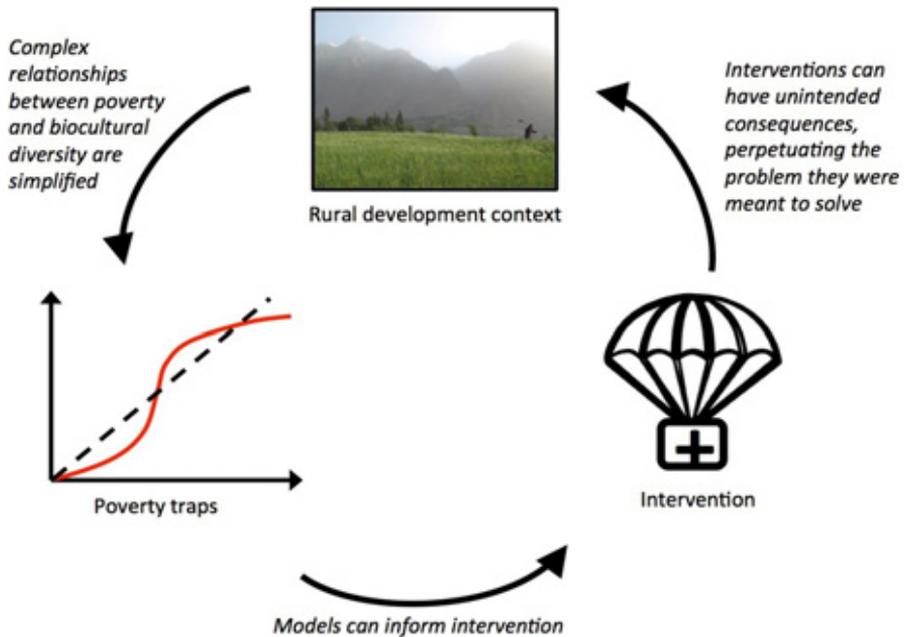


Figure 1. Persistent poverty is an emergent outcome of a complex set of relationships between people, nature, geography, markets, politics, etc. Persistent poverty is often simplified into conceptualisations such as the poverty trap, which inform intervention strategies, which in turn affects the identified problem context.

Much development research on poverty alleviation, in particular development economics, still lacks dynamic concepts and methods to integrate environmental and cultural attributes in a meaningful way (Nunan 2015; Brown 2016). For example, while many Millennium Development Goals (MDGs) (including those focused on poverty) were met (UN 2009), they suffered from a lack of integration (Sachs et al. 2009). In part, efforts to deliver on the MDGs were informed by the ubiquitous poverty trap model (Easterly 2006), and narrow poverty reduction interventions, focusing on economic well-being, continue to be the norm (Roe and Elliot 2010; 2012).

A decade after the MDGs, the post-2015 development agenda takes steps to resolve the modular thinking that characterised the Millennium Project by articulating the need for the Sustainable Development Goals (SDGs) to be integrated (Leblanc 2015; UN 2015). However, the reality of integrating these goals remains a huge challenge due to the lack of holistic conceptual thinking and the fragmentation of research and implementation programmes. The 2017 World Bank Report on Monitoring Global Poverty for example,

fails to mention environmental factors whatsoever (World Bank 2017). There is a noticeable gap between understanding and acceptance of the complex nature of poverty and the types of conceptual models that become influential and shape development interventions. New ways of thinking about and modelling integration are needed in order to meet the goals of human development in an increasingly interconnected world. While different disciplines have used the concept of a trap to describe undesirable persistent situations (in psychology, sociology, and environmental science for example) there has been no review or synthesis of this literature. To date, the poverty trap has been primarily a phenomenological concept (as poverty is experienced), and little systematic understanding exists of the mechanisms and causal relationships that actually reinforce poverty. A synthesis of conceptualisations across research fields could help set a stronger foundation for improved integration between different dimensions of poverty and the SDGs.

Sustainability science research, which has advanced thinking around social-ecological integration (Folke et al. 2000; Berkes et al. 2003; Folke 2006), has afforded little focus to questions of poverty alleviation (Kates 2011).<sup>3</sup> Increasingly however, sustainability science research has addressed issues around poverty alleviation and development, albeit while relying on development economics concepts such as the poverty trap. The traps concept has been increasingly used as a bridging concept between development studies and sustainability science, specifically in resilience studies (Maru et al. 2012; Barrett and Constanas 2014) that seek to incorporate poverty alleviation into questions of sustainability. I investigate the implications of the poverty traps concept from a critical starting point, and also acknowledge that it is a powerful concept in development practice, and is increasingly used to address sustainability related problems (Tidball et al. 2016). One objective of this thesis is to contribute to a more holistic conceptualisation of traps, which better incorporates the dynamics of social and ecological relationships. It does this by advancing insights that contribute to the new research frontier of resilience and development, using poverty traps as a bridging concept.<sup>4</sup>

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<sup>3</sup> Kates (2011) analysed all research papers in the sustainability section of PNAS at the time of their study (in total 232 papers), and found that 62 per cent had a major focus on sustaining environmental life support systems, 38 per cent primarily addressed human well-being and *only a few* directly addressed poverty alleviation.

<sup>4</sup> A *bridging* concept actively links fields and stimulates dialogue (Baggio et al. 2014). A *boundary* object is an entity shared by several different communities but viewed or used differently by each of them (Leigh Star 2010), which is an accurate description of the current state of poverty traps concept (see Paper I). A strength of boundary objects in critical scholarship is the possibility for cooperation without consensus. However, the narrow conceptualisation of poverty traps in development economics dominated the boundary area and does not lend itself to advising intervention strategies in a more complex social-ecological reality.

The second knowledge gap is more empirically oriented, regarding the limited understanding of the effects of conventional poverty alleviation strategies<sup>5</sup> in rural contexts where culture and nature have coevolved and are tightly intertwined.

There is a limited understanding of the subsequent effects of development interventions on biological and cultural diversity, and, in turn, how biocultural diversity can influence the effectiveness of development interventions. The relationship between biodiversity conservation and poverty alleviation has been the subject of decades of research (Adams et al. 2004; Roe and Elliot 2010), and has found that areas with high biodiversity are also often home to the poorest and most marginalized peoples (Fisher and Christopher 2006; Sukhdev et al. 2011; Roe et al. 2013; Hussain and Miller 2014)<sup>6</sup>. Very little work however has been done to further understand how poverty and agrobiodiversity specifically are related (Cromwell 1999), other than studies on food security which suggest that agrobiodiversity can provide the poor with cost-effective insurance against food security risks (Vira and Kontoleon 2013), and thereby possibly alleviate or reduce poverty, or at least buffer shocks. Much less research exists on the relationship between poverty and biocultural diversity, although the link has been acknowledged as extant and important (Johns and Sthapit 2004; Chappell et al. 2013; Gavin et al. 2015). A second cross-cutting objective of this thesis is to advance understanding of the implications of development interventions in contexts of high biocultural diversity.

## Research questions and approach

How can development processes<sup>7</sup> for alleviating poverty better account for coevolving relationships between people and nature? Situated at the core of the post-2015 development agenda, answers to this question will guide how humanity can navigate development pathways which are more ecologically safe and socially just (Raworth 2017). Specifically, the thesis focuses on the problem of how to alleviate poverty without reducing biocultural diversity. The main aim of this thesis is to improve understanding of how development processes for alleviating poverty could better account for relationships be-

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<sup>5</sup> In this thesis 'conventional poverty alleviation strategy' refers to asset inputs.

<sup>6</sup> Much of this work has been done using ecosystem services, which necessarily separates the social from the ecological in a reductionist and utilitarian way, and often implies monetary valuation.

<sup>7</sup> Contributions from individuals papers focus on poverty alleviation interventions, and throughout this introductory chapter poverty alleviation will be used interchangeably with development processes, which is used to denote a broader process than a single intervention.

tween people and nature in biocultural landscapes. The majority of the world's poor continue to live in rural areas, and biocultural diversity may prove to be critical for local and global resilience in the face of unknown changes and shocks. I draw on the concept of coevolution to describe the mechanisms in biocultural systems by which evolution in the social system affects the biophysical environment, which in turn affects the social system, and so on – such that they have causal influence on each other (Norgaard 1994; Kallis 2007; Horcea-Milcu et al. 2017).

Within the context of the global sustainability challenge to alleviate poverty without losing biocultural diversity, this thesis seeks to contribute to the previously identified knowledge gaps by responding to three interrelated questions:

1. How have poverty traps been conceptualised and what are the consequences of the assumptions behind these conceptualisations for alleviating poverty and fostering improvements in sustainability? (Papers I, II)
2. What are the effects of, and how do people respond to, conventional poverty alleviation strategies in landscapes with high biocultural diversity? (Papers III, IV)
3. What possibilities are there to alleviate persistent poverty in biocultural contexts that take social-ecological interdependencies into account? (Papers II, IV)

As a thesis in sustainability science (Clark 2007; Miller et al. 2014), this research is both problem-driven (Papers I and II) and solutions-oriented (Papers III and IV), and as such, demands a variety of methodological approaches. Paper V builds on the experiences of this thesis and asks:

4. What are the challenges facing researchers in effectively navigating the myriad methodological and epistemological challenges in conducting more rigorous sustainability science?

The specific theoretical contributions to development studies are to extend the use of the poverty trap concept to better reflect the reality of traps embedded in social-ecological dynamics. Contributions to resilience studies include a more holistic and process-oriented articulation of poverty-environment relationships.

## Context – The importance of biocultural landscapes

The thesis sets out to contribute to the overarching challenge of how development processes for alleviating poverty can take better account of social-ecological interdependencies that shape coevolution in biocultural contexts. This section outlines why biocultural contexts are particularly relevant for resilience both locally and globally.

First, a small note on ‘context.’ When I use *context* in this thesis, I refer to relationships between people and environment in a particular place.<sup>8</sup> For example, in some places, poverty may lead to further degradation of the environment (Barrett and Bevis 2015). In other places, poor people are stewards of the landscape and maintain environmental health (Forsyth et al. 1998; Cromwell 1999). While the motivations for, and questions of this thesis are very much inspired by a particular mountainous biocultural landscape in the Pamir Mountains, Papers I and II, and to some extent even the place-based Papers III and IV, speak to a much broader context of poverty in places with rich biological and cultural diversity the world over. Such places play a crucial role for future local food sovereignty as well as global food security (Leventon and Laudan 2017), as described below.

Approximately 10 per cent of the world’s population live on less than US 1.90/day (World Bank 2016b). I cite this monetary measure of poverty not because of its appropriateness but rather because it is often this monetary indicator of poverty that motivates development interventions. The majority of the global poor live in rural areas and are engaged in the agricultural sector (Dercon 2009), which motivates aid and development interventions to focus on this sector (World Bank 2007). These contexts are characterised primarily by family farms (which constitute over 90 per cent of all farms and produce at least 53 per cent of the world’s food (Graeub et al. 2016)). These farmers are continuously creating and maintaining the agricultural biodiversity that plays a crucial role in food and nutritional security and poverty alleviation (Graeub et al. 2016).

Agricultural biodiversity is all diversity related to agriculture, and provides the foundation for agricultural production (Thrupp 2000). Agricultural biodiversity is known to provide cost-effective forms of farm management through its role in improving soil health, food, and species habitat, thereby

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<sup>8</sup> In box 1 of paper II, we define context as the set of social-ecological relationships (as defined in Table 1 of Paper II) that are relevant in a particular case and thereby determine how different entities interact and vary over time. Here, we are particularly concerned with social-ecological relationships related to how agricultural practices affect the environment (for example, poor people do or not degrade the environment).

also improving the ability to mitigate and manage climate risks (Altieri et al. 2015). More diverse diets are also known to contribute to improved health and nutrition. The importance of global genetic crop diversity, especially in a changing climate, is broadly recognized (Lin 2011). Crops eaten all around the world today are the product of thousands of years of selection and modification, and a diversity of crops can increase the capacity to respond to a variety of different stresses or shocks (Meldrum et al. 2017). While food calories, protein, fat and weight are increasing, global crop diversity is suffering from a process of rapid homogenisation (Khoury et al. 2014). Background socio-political factors such as market dynamics, political power of large agrochemical companies, and trade are major drivers of this homogenization, but so too are development interventions, which aim to increase perceived food demand through agricultural expansion. Evidence suggests, however, that more intensive agricultural production will not necessarily resolve corresponding food distribution problems, and agricultural expansion is not only unnecessary but also further undermines the capacity of agroecosystems to preserve biodiversity (Altieri and Rosset 1999; Chappell and LaValle 2011; Tschardt et al. 2012; Haider and Boonstra 2017). It remains unclear how global and regional climate change will affect agricultural production around the world and which crop varieties will emerge as important to help meet future food security demands. Drought-resistant grains, such as those found in the Pamirs, will potentially become increasingly important. Correspondingly, ex-situ seed conservation initiatives have been set up (e.g. the Svalbard Global Seed Vault) to safeguard agricultural biodiversity. However, the knowledge and culture that created and is based on species and varietal use of crops cannot be stored in seed banks, but must be used and practiced if it is to survive. This is where the cultural aspect comes in.

Biocultural diversity is the diversity of life in all its manifestations: biological, cultural and linguistic –which are interrelated (and possibly coevolved) within a complex socio-ecological adaptive system (Maffi 2005; 2012). This definition is based on decades of research showing the causal relationship between language, cultural practice and biological diversity (Loh and Harmon 2005). While the term biocultural was originally used primarily to refer to indigenous and traditional peoples, it has been usefully extended through the broadening of the term to include dynamic processes of transcultural exchange and re-articulations of traditions which cause certain cultural practices to persist (Cocks 2006). Mountainous regions in particular are important harbours of biocultural diversity (Stepp et al. 2005). ‘Biocultural’ thus represents a set of social-ecological interactions in which the so-called ‘social’ and ‘ecological’ are so obviously and deeply interdependent that it would be difficult to separate them (I investigate the consequences of separation in Paper IV).

In the opening vignette with Dr. Shirinbek in the Pamirs, we see how biological diversity can be created and maintained by social practices and human ingenuity and in turn how cultural diversity can be created by landscapes. This is in stark contrast to other contexts with different poverty-environment relationships in which poor people may perpetuate environmental degradation (Barrett and Bevis 2015). This latter narrative is still dominant in global development discourse on poverty alleviation, despite its many problematic assumptions (Nunan 2015, Graeub et al. 2016), and provides motivation for the big-push style interventions critiqued in this thesis. Biocultural diversity in agricultural landscapes hosts global insurance value through crop diversity, but also through the diversity of social practices that are necessary to maintain – and gain value from – diverse crops, and is therefore an important source of resilience. Despite their irreplaceable importance, biocultural landscapes around the world are under threat from multiple and cumulative socioeconomic, political, technological, natural and cultural drivers (Plieninger et al. 2015).

# Theoretical Framing – At the interface of resilience thinking and development

The theoretical framing<sup>9</sup> of this thesis lies at the interface of resilience thinking and development studies. The thesis spans the intersection of these two broad fields, and draws heavily on concepts that inhabit the space between them, such as poverty traps and coevolution. These concepts, along with resilience and development, are increasingly used outside academia as buzzwords and bridging concepts, which creates a risk of them being used for political ends and thereby losing their meaning. Despite, or perhaps because of the fact that buzzwords are embedded in political contexts, they can also signify matters of societal concern, play a role in consensus-building and sometimes help set positive agendas (Bensaude-Vincent 2014). I therefore choose to engage with them in this way in my framing of the interface of resilience and development studies. As a subfield of sustainability science, resilience thinking features more strongly in my theoretical framing than poverty traps and related concepts from development studies, and is used as a foundation for my critique of mainstream development economics. This section seeks to provide an overview of how this thesis contributes to the increasingly prominent role resilience plays in development discourse.

The role of intervention is central to the problem of how to alleviate poverty without reducing biocultural diversity. The *raison d'être* of conventional development practice has been presented as the 'will to improve' (Li 2007). Likewise, much social-ecological research on resilience is interventionist (West 2016), seeking to manage systems to avoid 'undesirable' states and create more 'desirable' ones (Hahn and Nyqvist 2017). Development studies on the other hand have traditionally been more critical, having emerged out of concern for the impacts of colonialism and, more recently, post-colonial development interventions (Willis 2005). Intervention is by nature normative and thus calls upon critical inquiry to investigate the thinking and concepts that influence it, particularly the impact of development interventions on the ongoing ability for people to develop themselves (van der Ploeg 1994). The

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<sup>9</sup> Framing entails active choices of how to choose boundaries of a system, or which 'components' to include, and involve subjective and value judgments (Leach et al. 2010; West et al. 2014).

thesis, and its exploration of alternative development pathways, is motivated by the observation that many development interventions in biocultural landscapes fail, but does not study reasons for their failure as such. In this way, whilst I adopt a critical approach to engaging with theories and concepts of development I also recognise that the concepts I use – such as poverty traps – can hold power, and by studying them we can better understand and re-think interventions in biocultural landscapes.

## Poverty traps

Since the 1980s, poverty traps have become a powerful way to communicate the reinforcing mechanisms through which poverty can persist. The poverty trap is frequently defined as a persistent, self-reinforcing, undesirable state under an asset threshold (Azariadis and Stachurski 2005, Barrett and Swallow 2006, *and see results of literature review in Paper I*). In the mainstream development economics literature, traps have been used to describe how a focus on meeting basic subsistence requirements can inhibit the ability to accumulate capital (Asilis and Ghosh 2002; Azariadis and Stachurski 2005), or more simply as a self-reinforcing mechanism which causes poverty to persist (Azariadis and Stachurski 2005) whether at the national (Collier 2006a; 2006b; Sachs 2006) or household level (Carter and Barrett 2006; Wanjala and Muradian 2013).

Poverty is defined in many different ways. I perceive poverty as a multidimensional phenomenon (Alkire and Santos 2010) which moves beyond only economic poverty and also includes a lack of access to basic goods and services, rights to practice social and spiritual beliefs and preferences, access to appropriate food, and the capability and freedom to act (Sen 2001). Nevertheless, and particularly in the poverty traps literature, poverty is conventionally defined in economic terms alone, such as when a family's income fails to meet a nationally established threshold particular to that country. In much of this literature, poverty traps are measured based on certain indicators, for example the length of time persisting under a certain asset threshold (Jalan and Ravallion 2002, Barrett et al. 2006). Ultimately, however, traps are conceptual constructs, which can also help to make sense of the complex causality that leads to the persistence of poverty (Barrett and Swallow 2006; Tidball et al. 2016).

The prominence of the poverty trap concept brought the 'Big-Push' model<sup>10</sup> of intervention, advocated in the 1950s and 60s (see e.g. Rostow 1959), back

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<sup>10</sup> Also known as Rostow's growth or take-off model (Rostow 1959).

into fashion over the past decade. Various best-selling books, such as ‘The End of Poverty’ (Sachs 2006) and ‘The Bottom Billion’ (Collier 2006) feature these concepts and models. Since then, publications on poverty traps have increased at least four-fold (*see Paper I*). The UN Millennium Project (2005) also solidified the resurgence of the ‘big-push’ model of development as a strategy to address the ‘poverty trap.’ Such a strategy would first and foremost entail “a rise in productivity, a ‘Green Revolution’ to raise food output. This would accomplish several important objectives and trigger a structural change in the economy” (UN Millennium Project 2005, pp. 33). While the millennium development project was successful on some accounts, such as in the reduction of monetary poverty in some regions (UN 2015), it failed to chart more integrated development trajectories.

Despite its many limitations, and my critique of the concept as having potentially harmful consequences for development work, I contend that the poverty trap concept is worth engaging with as it presents various opportunities for more integrated thinking around sustainable development. First, it portrays poverty as a persistent phenomenon emphasising structural barriers, offering the potential to go beyond linear neo-liberal growth theories. Second, it is a concept that is inherently dynamic, multi-level and cross-scale. For these reasons, among others, (as documented by Barrett and Constanas 2014), it has emerged as a potentially powerful bridging concept between resilience and development.

## Resilience as concept

Resilience is an increasingly popular term in development theory and practice (Warner and Grünwald 2012). Resilience has acquired power within development discourse – donors, governments and implementing organizations want to achieve ‘resilient livelihoods’ (FAO 2013) or ‘build resilience’ to climate shocks for example (USAID 2016). The popularity of the term is not accidental. Coinciding with the 2008 financial crisis, and emerging with the arguably increasing climatic uncertainty and political instability in recent years (Welsh 2014), resilience as a concept to describe the ability to bounce back from shocks resonates with many different actors (Tierney 2015; Simon and Randall 2016).<sup>11</sup> Recent work has sought to clarify the contributions of resilience thinking for development processes (Béné 2015; Bousquet et al. 2016; Folke et al. 2016), going so far as to say:

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<sup>11</sup> Critical theorists maintain that resilience has been popularized because it has been co-opted by a neoliberal agenda and maintains a pro-growth status quo (Hornborg 2009 pp. 252.)

*For the last decades, development has been [predominantly] conceived as a modernization process supported by scientific rationality and technical expertise. The definition of a new perspective on development goes with a negotiation on a new scientific approach. Resilience is presently at the centre of this negotiation on a new science for development (Bousquet et al. 2016).*

In a recent paper, Barrett and Constanas (2014) identify a lack of understanding of the integration of poverty and ecosystem dynamics. To address this shortcoming they outline a theory of ‘development resilience’ - with the poverty trap as the central concept - that focuses on the stochastic dynamics of individual and collective well-being. In this framing, poverty traps are defined and investigated primarily in relation to economic thresholds. In a similar fashion, traps have been increasingly used as a central concept to describe persistent poverty in social-ecological systems and resilience research where the biosphere is perceived as the basis for development (Folke et al. 2016). What both of these approaches have in common is that they frame poverty as the outcome of complex, dynamic and adaptive interactions between social and ecological factors and frame these interactions as ‘systems’ (Levin et al. 2013). Resilience in development encourages thinking about non-linear change and surprise in three distinct ways: persistence, adaptation and transformation.

Social-ecological resilience is defined as “the capacity to adapt or transform in the face of change in social-ecological systems, particularly unexpected change in ways that continue to support human well-being” (Folke et al. 2016). Folke et al. (2010) first outlined, followed by Béné et al. (2015), resilience as a result of a combination of three capacities, which lead to different short-term responses: 1) absorptive capacity which leads to persistence, 2) adaptive capacity which leads to incremental adjustments and changes, and 3) transformative capacity leading to transformational responses. These three aspects are important to consider for making sense of traps and development pathways since they describe the dynamics of persistence (including traps) and potential for certain types of change (adaptation or transformation).

Resilience, as it relates to persistence, is conceived of as a property and defined as the ability to respond to change without the loss of integral functions (Folke et al. 2010). In this sense then, resilience is not inherently good or bad, but becomes so in relation to its application. Problems arise when resilience as persistence is used in development. Traps are an example of conditions that have very high resilience but that are generally seen to be normatively undesirable states (Holling 2001; Allison and Hobbs 2004; Cumming et al. 2014). Maru et al. (2012) and Brown (2016) use the traps concept to emphasise the importance of separating resilience as a positive end goal and

as a property that can perpetuate poverty. Adaptation is about adjusting responses to changing external drivers and internal processes in order to remain in the same state. This is what development actors refer to when they aim to ‘build resilience’. A transformation requires a structural change that recombines social and ecological elements in fundamentally novel ways. Transformations tend to be intentional and challenge the status quo and lead to change across multiple scales (Moore et al. 2014; Hahn and Nyqvist 2017).

Persistence, adaptation and transformation feature as both outcomes (traps and development trajectories) and capacities (for stasis or change) in this thesis, and indeed the discussion section aims to advance specification of what resilience as capacity in development means. But the thesis also advances insights that contribute to efforts to use resilience theory as an approach.

### **Resilience as approach**

Resilience has been critiqued for confirming the status quo (MacKinnon and Derickson 2012; Hornborg 2013); critique that is perhaps triggered by its quick establishment as a buzzword in the development arena. Resilience has redefined itself over the years as a normative concept depending on: resilience of what, to what (Carpenter et al. 2001) and for whom (Leach 2008, Brand and Jax 2007). My thesis demonstrates how resilience can be used to fundamentally challenge that status quo (*as* Walker and Cooper (2011) *suggest*) and challenge dominant understandings of development, and more specific concepts such as the poverty trap. In so doing I invoke the critical potential of resilience as a challenge *to* power, including by paying attention to normative and epistemological issues underlying resilience (Cote and Nightingale 2012; Boonstra 2016; West 2016).

Resilience in this thesis is used as an approach in a number of different ways: (1) as a property of persistence in conceptualising and modelling traps (Papers I and II); (2) resilience thinking to guide theories of social-ecological change, for example regime shifts to inform thinking of interventions (Paper II); and (3) as a capacity (Béné et al. 2015; Brown 2015; Papers III and IV in this thesis). In this sense, agency is an attribute of individuals that through their actions and interactions (constrained by power structures, institutions etc.) produce emergent outcomes at higher levels, such as adaptation or transformation. Brown (2016) anchors resilience to a set of social practices – which she terms ‘everyday forms of resilience’ – that represent the strategies and struggles of people dealing with change.

A resilience thinking approach assumes that 1) the social and ecological are deeply intertwined, and 2) interact across scales, 3) through a process of coevolution. All papers in this thesis present the social and ecological as intertwined by virtue of their biocultural context – the nature of these relationships is elaborated in paper IV. The thesis holds in tension the dialectic between top-down exogenous interventions (Papers I-II) and bottom-up endogenous development processes (Papers III-IV), through an active cross-scale filtering process described in the discussion. Finally, coevolution is the mechanism by which development happens, and warrants further explanation.

## Development as coevolution

Development, just like resilience, is also a contentious term. In popular use, development refers to ‘international or global development,’ which is a state of improving human well-being of the poor and has a normatively positive connotation. While I use this definition as a starting point, I suggest this conventional approach to development is problematic and needs to be reconsidered. Richard Norgaard (1988; 1994) offers a critique of development from a systems perspective in which he laments that the very notion of progress has been hijacked by an approach to development that is anchored in economic big-push theories. As opposed to treating development as a positive end-goal to strive for, Norgaard proposes instead to consider development as a process (*see also* Mosse et al. 1998) of coupled change between practices, values, and the biophysical environment. Humans change environments both materially and cognitively and in turn, new environments change human practices and ideas (Norgaard 1994). Norgaard’s approach to development therefore fits very well with the deeply intertwined perspective that is so important in biocultural landscapes. Kallis (2007) defines coevolution as two systems or entities that have causal influence on each other’s evolution. Coevolution as a theoretical concept allows us to explicitly consider social-ecological relations and the phenomena, such as traps, that emerge from their coevolution over time. Norgaard (1994) proposes five core systems that interact with each other: organization, values, technological, knowledge, environment, which are interrelated in coevolved relationships. I use the concept of coevolution and these five aspects to ‘operationalize’ biosphere-based development in order to understand the processes that shape the development of social-ecological systems. Organization, values, technological, knowledge, and environment are all equal, no system dominates over the other, and each can only be understood in relation to the other (Norgaard 1988).

Moving from this macro to a more micro agency-centred perspective, Boyd and Richerson's theory of cultural evolution is a useful complement to Norgaard by specifying the means of coevolution at individual scales through 'everyday practice':

*In the same way that evolutionary theory explains why some genes persist and spread, a sensible theory of cultural evolution will have to explain why some beliefs and attitudes spread and persist and others disappear. The processes that cause such cultural change arise in the everyday lives of individuals as people acquire and use cultural information. Some values are more appealing and thus more likely to spread from one individual to another. These will tend to persist, while others disappear (Richerson and Boyd 2005 pp. 6).*

## Everyday practice

'Everyday practice' is an observable action which links human behaviour to the material world. The practice of collecting grains from a landscape, drying, threshing, milling, and finally preparing dough from flour and baking bread is an example of an everyday practice. Everyday practice offers a lens to understand the effects of interventions and responses and has long been recognized as an important form of resistance against top-down interventions (Scott 1985) and as a source of resilience for development (Brown 2016). Moreover, practice enables a holistic view of social-ecological relations. If intervention is considered as an exogenous development action, everyday practice is endogenous. I focus on intervention and practice in order to make the otherwise broad concept of development more visible, and to hold these two otherwise dichotomous concepts (endogenous and exogenous) in tension with each other. My use of practice is in line with 'practice theory' as attributed to Bourdieu through his concept of *habitus* (1977) and others, though I do not draw on practice theory explicitly.

Modernist interventions are historically known for eroding endogenous local capacity (Scott 1998; Li 2007; 2014). Bunce et al. 2010 give an example from East Africa, which shows how conventional conservation and development practices actually undermine people's resilience. A commonly heard critique of exogenous development interventions is that they treat beneficiaries of development as objects without agency (Mosse et al. 1998; Sen 1999). Beyond this, many development projects still assume subjects of development have the agency to articulate their needs – but compelling critique suggests otherwise, and that in many cases where views of the subjects have been historically oppressed or disenfranchised, when finally given voice,

people often struggle to articulate their true endogenous wishes rather than those imposed by the outside (Spivak 1988). I therefore use the concept of everyday practice to navigate around this problem, and in my methodology use observation of practice in addition to interviews to unearth more endogenous ideas (Haider and van Oudenhoven 2015). Such endogenous development ideas are founded on locally available resources; including natural, labour and knowledge resources, and endogenous practice tend to materialize as self-centred processes of growth and change (Long and van der Ploeg 1994, p. 2). Entirely endogenous development processes on the other hand are sometimes critiqued for being overly naïve and ignoring cross-scale interactions and economic realities (Margarian 2013). Frances Cleaver (2012) occupies a middle-ground in this debate using social theory and the concept of *bricolage*, which is a process that involves the piecing together of old and new to make something different (while still socially fitting). She calls this a “patchwork of the new and the second-hand” (ibid, p. 46) suggesting that: “borrowing well-worn practices, symbols and relationships offers a fast route to weaving new arrangements into the social fabric.” Development then, is nothing more than the process of coevolution, configuring and reconfiguring endogenous and exogenous processes for different emergent outcomes.

# Research Approach

Given the nascence of sustainability science, its highly inter- and trans-disciplinary nature, and its quest to answer both basic fundamental scientific questions as well as to pursue solutions to pressing problems with ‘entrepreneurial spirit’ (Clark 2007) it is to be expected that ontological questions, epistemological tensions, and methodological clashes would arise, requiring at times delicate navigation.

The papers that compose this thesis contribute to the same overarching sustainability-related problem, with results and insights that are use-inspired and solutions-oriented, in keeping with the expectations of sustainability science research (Kates et al. 2001; Clark 2007; Miller et al. 2014). I proceed with this ‘use-inspired’ approach with humility and caution, to avoid epistemic or methodological fallacies. In the following section, I outline the ‘-ologies’ that have helped guide my research, describing the process of mixing and matching of diverse epistemologies and methodologies. I take a reflexive focus on my positionality throughout this process.

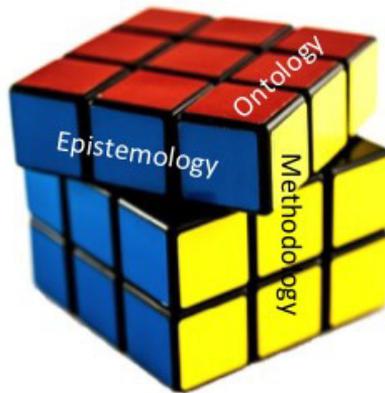


Figure 2. The pursuit of the research questions in this thesis has required mixing and matching of ontology, epistemology and methodology. There are thousands of permutations in a Rubik's cube, however reflexive navigation is needed to avoid incommensurate combinations.

## Philosophical perspectives in sustainability science<sup>12</sup>

I use multiple research approaches, which require a combination of both epistemological agility (Paper V) and methodological pluralism. I am keenly aware of some of the epistemological (and perhaps ontological) tensions in the various contributions of this thesis, and by making them explicit I seek to expose challenges and opportunities involved in the ongoing development of a more effective and rigorous sustainability science.

To describe my **world view** (Table 1), about what reality is, and the basic beliefs that guide action (Guba and Lincoln 1994; Tàbara and Chabay 2012), I return to the images of the opening vignette. In order to understand how Dr. Shirinbek shapes the landscape of the Pamirs, or to understand how the landscape shapes Dr. Shirinbek's practices, language, and culture, we must understand the ties between people and landscape, society and ecology as relationships. Over centuries, or indeed over millennia in the case of the Pamirs, culture and nature have coevolved through a tightly interwoven, dynamic process. Phenomena, such as poverty or cultural rituals, can be observed or interpreted as emergent from the relations between people and nature. In other words, people are both 'within' and 'affecting' the processes we are trying to understand. This fits with a relational and process-oriented ontology (Whitehead 1929).

Complex adaptive systems are a way of organising and understanding complexity (epistemological), while certain emergent phenomena are observable (as a basic category of being, and therefore ontological) (McIntyre 1997). Social-ecological systems are complex adaptive systems (Levin et al. 2013; Folke et al. 2016), where the focus from the researcher's perspective is on the relationships between social and ecological 'entities' and their interactions. A social-ecological systems lens (epistemological) is useful for understanding these relationships and I adopt the notion of deeply intertwined systems as a helpful way to describe them (Folke et al. 2016), although the concept has limitations in terms of its inherent dichotomisation of the social and ecological (Schlüter et al. *in preparation*). Further in line with this dichotomisation, much of the social-ecological and the resilience literature focuses on the idea of "reconnecting to the biosphere" (Folke and Gunderson 2012). The notion of 'reconnecting' has taken on a normative meaning that

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<sup>12</sup> This section is written as a thought exercise based on Moon and Blackman 2014: "A philosophical perspective is something personal that drives the way research is conducted; it is underpinned by ontological and epistemological leanings and influences how a researcher creates knowledge and derives meaning from their data."

has been critiqued, since from a complexity and relational perspective everything only exists in relation to something else, which makes using reconnection as an analytical framework somewhat tautological (Cook et al. 2016). In response to this perceived ‘disconnection’ to nature, the social-ecological literature often uses the language of ‘ecosystem services’ (Biggs et al. 2012; 2015; Folke et al. 2011), ‘natural capital’ (Costanza et al. 1997) or ‘nature’s benefits to people’ (Díaz et al. 2015). While helpful in some contexts, in places like the Pamirs where culture remains deeply connected to nature, *biocultural* may be a more appropriate term to describe and understand the interdependence and coevolution between ecology and society. Paper IV makes an attempt towards a more relational philosophical perspective (while still framed within complexity).

The **ontological** foundations of this thesis range from critical realism to bounded relativism (Table 1). Critical realism assumes there is one reality that can be observed, but that it can never be understood because of the limits of human intelligence and therefore must subject to broad critical examination (Moon and Blackman 2014). Bounded relativism acknowledges the existence of multiple realities, based on the experiences and culture of social groups (Moon and Blackman 2014).

Papers I and II take a more **epistemologically objective** approach (Table 1), where persistent poverty and the degradation of the natural environment (in terms of declining agricultural biodiversity) are problems that can be observed, while critically investigating the popular conceptualisation of poverty traps. An objectivist epistemology makes the assumption that reality exists independent of human perception and that verifiable objective truths exist (Crotty 1998). Papers III and IV take a constructivist approach, where truth comes into existence through our engagement with the realities of the world and individuals construct meaning in different ways based on cultural and historical perspectives (Crotty 1998). In papers III and IV the focus is on how people experience and respond to poverty and loss of agricultural biodiversity.

Table 1. A thought exercise to map out the different ontologies, epistemologies, applications and methodologies of this thesis.<sup>13</sup>

World View: Complexity					
	Paper I	Paper II	Paper III	Paper IV	Paper V
<b>Ontology</b>	Critical realism $\leftrightarrow$ Bounded relativism				Epistemological agility
<b>Epistemology</b>	Objectivism		Constructivism		
<b>Application</b>	Social-ecological Use-Inspired				
	Post-positivism/ Structural	Critical theory/ Structural	Structuration	Emancipatory critical theory	
<b>Methodology</b>	Abductive				Methodological pluralism
<b>Methods</b>	Literature review	Empirical observation, Literature review, Dynamical systems model	Participant observation, Interview, Comparative cases	Participant observation, Interview, In-depth case, Abductive coding	

While all the contributions of this thesis are use-inspired from a social-ecological perspective, each offers a different **application**. The literature review conducted in Paper I is applied with the aim of improving understanding of mechanisms of traps in order to better predict the types of conditions that give rise to traps in social-ecological contexts. It is post-positivist in the sense that I assume multiple methods are necessary to identify a valid belief because all methods and conceptualisations are imperfect, and structural since I assume in this paper that phenomena (like traps) emerge from observable structural conditions. Paper II draws on the insights from the literature review in Paper I to build a set of dynamical systems models which are used to challenge the status quo, and is therefore grounded in critical theory. Paper III deconstructs more conventional ways of understanding traps and proposes a new typology in which responses to traps arise through different narratives and within a certain historical context. Finally, paper IV

<sup>13</sup> This sense-making of ‘ology’ was inspired by Moon and Blackman (2014) and Blaikie (2007).

enacts emancipatory critical theory in that it aims to empower the subjects of the study to change their situations. Leaning more towards interpretive theory, I engage with the communities of study by participating in the preparation of food and engaging in ritual in order to overcome barriers to discourse or understanding in a region where marginalised views are often otherwise oppressed. The focus on efforts to overcome barriers to discourse and/or understanding in turn points to the emancipatory potential of resilience theory as has been recently articulated in grassroots societal change, such as the Transition Town movement, where resilience is seen as a power for driving change and overcoming barriers (Welsh 2014).

The piecing together of these different ontologies and epistemologies was not planned, yet nor did it happen by chance. It was through a process of collective reflexivity within the PhD cohort that the term epistemological agility emerged as the core competence to pursue rigorous sustainability science (Paper V). The integration of these different ways of knowing also requires different ways of acquiring knowledge (Raymond et al. 2010). I describe the weaving together of epistemologies and methodologies in this thesis using the concept of methodological pluralism.

## Methodological Pluralism

Methodological contributions of the thesis range from place-based research to conceptual modelling. The previous section lays out some of the potential epistemological tensions between the various papers of the thesis, and in so doing demonstrates the unique contribution of each way of knowing to the challenge of alleviating poverty whilst conserving biocultural diversity. In using the conventional poverty trap equations and models I was able to uncover assumptions made in the economic models that reveal their neglect of cultural and ecological dynamics; providing a stronger foundation for critique and future research. Multiple methodological approaches are necessary to match the various epistemologies defined in the previous section. Methodological pluralism argues for a middle ground between traditional epistemological boundaries and an epistemologically naïve "anything goes" approach (Roth 1987 pp. 98; Table 1). Clearly there is not one best, let alone all-encompassing, perspective for understanding and managing problems of the complexity we know, and thus a plurality of methodologies is necessary. Norgaard (1989) goes so far as to claim that methodological pluralism could help sustain biological and cultural diversity with respect to questions of sustainability. Indeed, we have seen how the adoption of: scientific forms of knowing, market economic orthodoxies, technological interventions, and Western democratic principles have contributed to the reduc-

tion of both cultural and biological diversity (Sutherland et al. 2013, Tengö 2014; 2017). Constantly using multiple methods reminds us of the complexity of social and ecological systems, and the difficulties of having the confidence to take action.

Conceptual pluralism goes hand-in-hand with methodological pluralism. To accept methodological and conceptual pluralism is to accept multiple insights and the fact that science will always fall short in being able to describe complex systems consistently, to predict how they might behave, or to prescribe how to make them behave in another way. This thesis presents a plurality of approaches to, and conceptualisations of, traps on the premise that the way we think and do science affects both culture and ecology.

## Methods

While a plurality of methods is used in this thesis they all have an abductive approach in common. In this approach, the choice and development of theory, data collection and analysis are tightly intertwined (Lofland 2006; Swedberg 2017). Data gathering and theory development often occur simultaneously (Bryman 2012 pp. 401; Dubois and Gadde 1999). In paper I, the search terms and the coding were modified multiple times as trends emerged from the data analysis. Likewise, with the theoretical model of Paper II, frequent iterations between theoretical models, case-based knowledge and evidence from the literature changed the way we constructed the model. For papers III and IV, case study design study occurred throughout the collection of data and analysis (Yin 2003, p. 52). Paper IV in particular takes a very open, participant observation approach with only semi-structured questions, and therefore the direction of study changed multiple times. The coding of qualitative data also took place in an abductive fashion, where a more theoretically informed coding scheme was only applied after the second round of inductive coding. Paper V engages with a survey method, qualitative data analysis and again, an abductive approach through the application of forum theatre, which was used both reflexively to inform the research inquiry as well as to invite participation as part of the data collection process.

## Place-based research – The Pamirs



Figure 3. The Pamir region of Tajikistan: bordering Afghanistan, China and Kyrgyzstan. Major valleys, which correspond with biocultural boundaries, are demarcated in black contours. Primary data collection for this thesis took place in Bartang valley. Source: Mats Halldin, accessed via Wikimedia commons.

This thesis is deeply place-based (*as described by* Balvanera et al. 2017). The Pamir Mountains provide inspiration for all the papers in this thesis. However, the insights of this thesis also apply to other contexts of poverty and high biocultural diversity, as the Pamirs are characteristic of other mountainous biocultural systems (Stepp et al. 2005). The Pamirs are among the world's highest mountain ranges, spanning across Tajikistan, China, Afghanistan and Pakistan (Figure 3). Besides being home to some of the world's largest glaciers and endangered fauna, the Pamir region is also a 'Vavilovian Center of Diversity' named after the prominent Russian and Soviet botanist and geneticist Nikolaj Vavilov, to denote areas of the world with great density of biological and cultural coevolution that have given rise to nearly all the crops in production around the world today. Rye is a notable example of a wild plant that was selected and domesticated first in the Pamirs (Vavilov 1917). The Pamirs produce such a staggering variety of grains in large part due to the altitudinal experimentation that farmers engage in. For example, growing wheat at up to 4,000 m. As a result, at least 151 wheat varieties are found in the mountains, and some varieties of legumes, walnuts, and apples are thought to also have originated in the Pamirs, alongside abun-

dant varieties of apricots, cherries, and mulberries (Nabhan 2009; *and personal communication with scientists at Pamir Biological Institute*). This incredible agricultural biodiversity coevolved with the ethnically Pamiri people, and seven distinct and unwritten languages are still spoken on the Tajik side of the Pamirs today, adding cultural isolation to the biophysical barriers imposed by the mountains. Despite their obvious isolation, the Pamirs were a major thoroughfare along the ancient Silk Road. Today, once again, the Pamirs are at the centre of the Chinese ‘Belt and Road’ initiative for westward expansion of modern Chinese influence.

The administrative title of the Tajik Pamirs is Gorno-Badakhshan Autonomous Oblast (G.B.A.O.). The research included in this thesis focuses only on the Tajik part of the Pamir Mountains, as the logistics of conducting research on the Afghan side of the border are currently challenging due to security concerns. The Pamirs were once one region, until the Great Game of the 19<sup>th</sup> century between Russia and Britain which ended with the signing of the Pamir Boundary Commission protocol (Gerard (original 1897) 2009), dividing the Pamirs into two with the Oxus River as a new border (currently known as the Pyanj river, which downstream becomes the Amu Darya). This led to two distinct development trajectories for the two sides of the river: the Northern banks of Tajikistan benefitted from 70 years of Soviet development, while the Northern Areas of Afghanistan remained a lost frontier and were dominated by warring factions throughout the 20<sup>th</sup> century. Informal estimates of the population of GBAO are thought to have risen to 220,000 people from the last official census in 2010 at 206,000. The Pamir region is the poorest area of Tajikistan, and therefore of all Central Asia, with over 84 per cent of the population classified as poor (Markandya and Sharma 2004; Robinson 2005; Middleton 2016). Despite this statistic, poverty in the Pamirs is not easily defined. Literacy rates are incredibly high (99 per cent), as is the level of tertiary education (Middleton 2016). Nevertheless, few job opportunities exist, and salaries are not high enough to provide for a basic level of subsistence, which is why the majority of young people migrate to Russia or other Central Asian states and send home remittances. People are very proud of their Pamiri heritage and Ismaili religion and as one young schoolteacher who had recently returned to Bartang Valley from Moscow told me: “we leave in order to come back.” People work abroad for long enough to start building a house back in their mountainous home.

## Ethics and positionality

### Of method selection

*The choice between methods [...] is a moral decision--a question of how one chooses to view one's fellow humans, or a question of the purpose for which one is studying them. The method is a function of the interests of the researcher and not of the essences of the objects studied (Roth 1989, pp. 175).*

When selecting methods, one must ask what are the assumptions that underlie certain epistemologies. By adopting a particular framing or method, one necessarily excludes others. Method selection thus becomes a moral act – to which knowledge do you choose to give voice and power? Whose knowledge counts and why?

My entry to the research questions I pose and methods I select are motivated by experience and are interventionist oriented. This thesis is a response to my observations as a development professional that - despite often being grounded in an in-depth understanding of the multidimensionality of poverty and fragility of ecosystem dynamics - development projects continued to be implemented with a narrow focus on measures of human well-being at the expense of biological and cultural diversity. The papers included in this thesis reflect the moral choices I've made along this research journey. The literature review conducted for the first paper was done to provide an overview of the traps literature. This overview aimed to understand how this popular term has been used, and to systematically assess the gaps in trap conceptualisations from a social-ecological perspective, and identify opportunities for broadening the concept for understanding trap dynamics in social-ecological contexts. In the second paper, we chose to use existing economic theory and models in order to test how the inclusion of natural and cultural capital can change the outcome of economic models without fundamentally disputing economic theory. In this way, otherwise marginalized development pathways, like agroecology and food sovereignty were given equal weight alongside established economic models.

My decision to engage with the traps concept was made such that I could a) choose to interact with, and possibly impact, mainstream literature on poverty alleviation, b) advance insights at the interface of development and resilience through the use of poverty traps as a boundary object. My 'natural' moral compass points much more to the type of research conducted in papers III and IV, but I also appreciate the value in engaging with the traps concept in order to reach broader audiences and challenge my own assumptions. The participatory observation method used in papers III and IV enabled me to

once again dig deep into the Pamiri case study that initiated the questions that are at the heart of this thesis and to give voice to knowledge that is often not articulated and therefore remains invisible.

### **Of placed-based research<sup>14</sup>**

This research builds from nine years of continuous engagement with key development actors and specific communities in the Pamirs. The specific field time of the empirical research for this thesis (Paper IV) was two months, building on two previous trips to the Pamirs during the time of this PhD.

All the usual caveats of a white, female, foreigner in a developing context apply here (Milner 2007) and there are a number of ways I engaged with these challenges. My field assistant and co-author on paper IV is an ethnobotanist from the Pamir Biological Institute, with whom I have been working with for many years. She is well-trusted in the region, both with development and government actors, but more importantly with local community members. She herself is from Rushan district, the district where the empirical research took place, and where she conducted her Master's research on medicinal plants (Akorbirshoeva 2012). I provided full disclosure of my research plan to the main non-governmental organization in the region who helped facilitate my visa process. I knew many of the community members personally from longer research stays in 2009-2012, and as an author of the book 'With Our Own Hands: A celebration of food and life in the Pamir Mountains of Afghanistan and Tajikistan' (van Oudenhoven and Haider 2015) my name and interests are well-known throughout the Pamirs, which creates both opportunities and challenges in terms of access.

All interviews were held in the local language and dialect (*Rushani*) as opposed to the official Tajik language. I speak some of the main local language (*Shugni*, similar to *Rushani*) and continued to take language lessons while there. I speak and understand some Tajik, in order to be able to communicate basic aspects of daily life and follow interviews. Importantly, I know many relevant local names of important plant varieties (wild and crops), local dishes, post-harvest practices and cultural rituals, which differ from valley to valley. Local vernacular is used in Paper IV when a word means and represents more than can be expressed in its English translation. Participants were

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<sup>14</sup> A formal ethics assessment was conducted prior to fieldwork in regulation with Stockholm Resilience Centre guidelines and available upon request. In addition, the ethics assessment was reviewed by a third party at Stockholm University and submitted to the European Research Council grant body.

compensated with local currency to cover their time, travel costs and food ingredients.

### **Of Food: Connecting poverty and agricultural biodiversity**

The prologue highlighted how development solutions are determined by the problems we frame and the questions we (donors, practitioners, researchers) ask. If hunger is the problem, increased production is often cited as the solution. Asked which ecosystem services people value, a researcher should not be surprised when the subjects answer with a neat list of examples. When a development worker asks what people wish for in the future, often responses are about market development, infrastructure and better agricultural inputs. While this is a bit of a caricature, the point is that the way in which we approach qualitative research influences the responses we receive. Gayatri Chakravorty Spivak (1988) describes this as ‘the colonized mind.’ In Haider and van Oudenhoven (2015), we describe the genealogy of ideas (Foucault 1971) as emergent from relationships in landscape, and describe how “Food as a Method in Development Practice” can be used to uncover novelty and innovation. This methodology has been central to my thesis, particularly Papers III and IV. In areas like Tajikistan, where there are strongly entrenched customary power relations, finding a method to open up a new space for dialogue can be a challenge. Cooking food with women in a participatory way can i) shift existing customary power, ii) excavate ideas when those power relations have infiltrated to the collective unconscious memory and the dispossessed feel that they have ‘nothing to say’ (Spivak 1988) and iii) provides an avenue for the newly excavated ideas to take root (Haider and van Oudenhoven 2015). Food is emotive, evocative and everyone can relate to it in deep and unique ways.

This method can be classified as participatory observation. Pamiri people are famous for their hospitality and sharing. It is impossible not to stop by a house without having an extended tea break, which always includes at least bread, but often also fruits, nuts and the now ubiquitous store-bought sweets. Conversations would often simply start with questions around how food has changed over time. During the research for the book, we would often arrive in villages with a specific quest to find a recipe that we had heard that village does particularly well. For the research included in the core papers of this thesis I focused only on two communities. Using food as method meant anything from simply helping my host prepare the meal and asking questions about where the food came from to observing the technique of her hand movements (Figure 4). Over the years, I have also found that asking a group of people to prepare food of which they are proud creates a collective feeling of pride and provides deep insights into the cultural and ecological aspects of the landscapes. Preparing a few dishes with a small group in the villages

would involve walking through the fields where the crops were grown, inspecting the (often very complex) irrigation systems, visiting the mill and storage, winnowing grain, the actual food preparation itself and the cultural and spiritual contexts in which the food is then enjoyed.



Figure 4. Baking *kulcha*, a rich bread for wedding or travelling, with *rashtak*, the famous red wheat of Bartang valley in the traditional *tandoor* oven. (Photo: Anzurat Akorbirshoeva).

It is easy to see how food as described here can offer a useful entry point to participatory observation. Food is, however, more than a method or a methodological approach. As a universal object, it encapsulates the very relations between elements of life that researchers and development practitioners otherwise separate. A recent study has found that food networks can reinforce linkages between biological and cultural diversity in landscapes (Plieninger et al. 2017). Food is holistic in that it encompasses health, environment, spirituality and culture. Thought of in this way, food is a relatable way to investigate complex adaptive systems – these entities do not exist in structured components, but rather together can form entirely new structures that would not have been possible as isolated components.

### **Of giving back**

Between 2010-2015 I was deeply involved in the writing of ‘With Our Own Hands’ which documents practices and rituals around food in the Pamirs (van Oudenhoven and Haider, 2015). While it started as a recipe book, it quickly became much more, opening up stories of health, spirituality, ances-

tral beliefs and environmental, social and political change. Since much of the writing took place ‘beside’ my PhD, each was invariably influenced by the other. If I was reading and writing about broad conceptual models of poverty by day, I was digging into our rich qualitative data for the book by night.

The book was published in three languages, English, Tajik and Dari, and one book was distributed to every community in the Tajik and Afghan Pamirs. Bringing the books back in 2015 was an incredible experience. As one man said after leafing through each page, “you’ve captured the knowledge which until now has only existed in our hands.” It became clear to me that there is a role to play in creating space for these stories and narratives, and the roles that pride and celebration can play in preservation of biocultural heritage.

As part of the fieldwork for this thesis, a local artist produced watercolour paintings of the visions of various communities. These have been printed as posters (by a local Pamir-based designer) and given back to all the communities who participated (found in Epilogue).

In order to give back to the local NGO who hosted me, I coordinated a full day training seminar in resilience thinking at their request, building on multiple training seminars in resilience thinking initiated by The Christensen Fund in partnership with the Resilience Alliance in 2008 with the same organisation. I was not embedded in the organisation, and relied only on external research funding. In this way, I remained ‘external’ to the development organisation and navigated the tension that Mosse (2001) describes between critical analysis and engagement.

## **Of collaboration**

The majority of the time my research did not take place in the field, but in a highly inter-disciplinary research centre, which brings up its own issues of positionality and collaboration. The ‘undisciplinary’ research journey is described in detail below (in Paper V) as part of a sustainability science PhD cohort. My research was also embedded in the context of the ‘SES-LINK’ research group which studies coevolutionary dynamics of social-ecological systems with the aim of developing middle-range theory of social-ecological change. The majority of the members of this group use systems or agent-based modelling as a primary method. My epistemological and methodological comfort zone is in place-based in-depth qualitative research (e.g. Papers III and IV), so while I sometimes felt ‘the odd one out’, this group provided space for novel collaborations, which would have been unlikely to occur otherwise (e.g. Paper II is a production of this intra-group collaboration). I learnt how to find a way of stating assumptions that I was comfortable with in an iterative process. Normally, I would feel uncomfortable simplifying

what I conceive to be beautifully messy narratives into an ‘oversimplified characterisation’<sup>15</sup> of physical, cultural and natural capital (*as we do in Paper II* and Miculcak et al. 2015). But in so doing, we were able to give power to development narratives like food sovereignty or agroecology that often remain outside of the mainstream and gave these narratives a more powerful voice alongside the economic models. Moreover, it challenged me to question my own assumptions and more critically investigate the factors that lead to poverty’s persistence or alleviation. The methodology I’ve chosen in the different papers represents my moral compass and the ethical choices involved in choosing whom you do research for, why, and how.

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<sup>15</sup> Welsh (2014) states that resilience theories are very useful tools that allow us to simplify extreme complexity, but also that it is a researcher’s responsibility not to imbue the simplified ‘system’ with ontological permanence that obscures the very complexity of life that research aims to capture.

# Findings – Individual papers

## Paper I: Traps and sustainable development in rural areas

*Summary: Trap dynamics are conceptualised differently across disciplines, but persistence, self-reinforcement and undesirability are common (but not sufficient) conditions to describe traps embedded in social-ecological contexts.*

The thesis presumes that the way poverty is conceptualised has implications for poverty alleviation strategies. As laid out in the theory section, the poverty trap is a popular way to conceptualise persistent poverty, and is increasingly used in sustainability science. Paper I provides a critical appraisal of existing trap conceptualisations in different disciplines, and assesses the characteristics and mechanisms that are used to explain poverty traps in rural contexts through two different literature reviews. Results from the first review outline how traps, and the dynamics that lead to traps, are defined and used differently in different disciplines, but also that the concept of a poverty trap has been most powerfully shaped by work in development economics. This conceptualisation is problematic when considered in social-ecological contexts since it ignores ecological dynamics.

A second, more in-depth literature review of 30 studies in rural development contexts was conducted in order to define characteristics, mechanisms and drivers of traps in order to go beyond generic descriptions of trap dynamics. Our results demonstrate that different definitions of traps share a set of common characteristics – in that they are persistent, undesirable and self-reinforcing. Yet, in this paper we suggest that these minimum conditions are not sufficient to understand how trap dynamics arise from complex social-ecological interactions.

To broaden the utility of the traps concept we propose a more social-ecologically integrated definition of traps that includes four additional considerations: cross-scale interactions, path-dependencies, the role of external drivers, and social-ecological diversity (Figure 5). Including these wider dimensions would help to better account for the diverse social-ecological

feedbacks that produce and maintain poverty traps, and could strengthen strategies to alleviate poverty in a more integrated way.

The review of trap dynamics provided in paper I provides the foundation for the subsequent papers in the thesis by highlighting the need for more holistic conceptualisations of trap dynamics with regards to questions of sustainability and understanding the effects of big-push style interventions. Social-ecological diversity is explicitly considered in Paper II, and the cross-scale interactions through scale mismatch features in our conceptualisation of traps in Paper III.

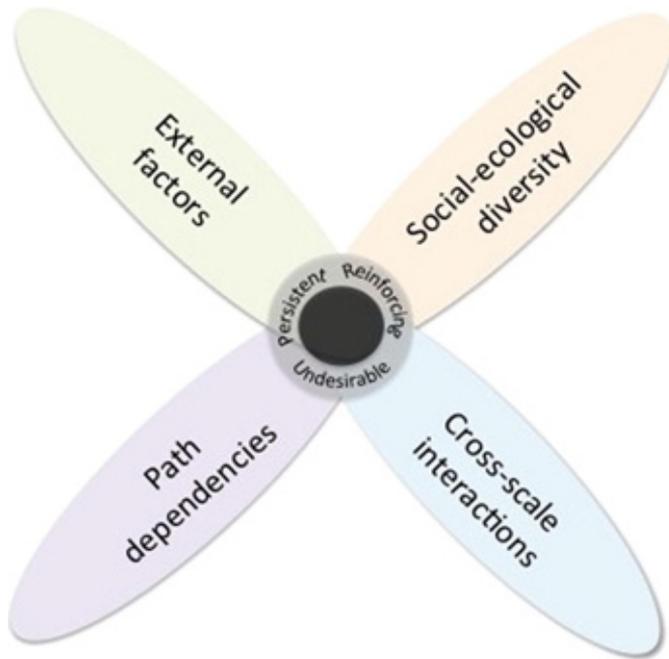


Figure 5. The literature review of traps conducted in Paper I finds that ‘persistent, reinforcing, and undesirable’, are necessary but not sufficient conditions to describe a poverty trap. Four additional conceptual components to consider when conceptualising traps in embedded social-ecological systems are: the role of external factors, social-ecological diversity, cross-scale interactions, and path dependencies.

## Paper II: Resilience offers escape from trapped thinking on poverty alleviation

*Summary: Development interventions to alleviate poverty have differential impacts on nature and culture depending on the poverty-environment relationships that define context.*

The review of paper I shows that popular conceptualisations of poverty traps tend to ignore social-ecological dynamics. As outlined in the introduction of this thesis, alleviating poverty in an integrated way without degrading ecological and cultural diversity remains a major development and conservation challenge. In paper II we integrate dimensions of nature and culture into a multidimensional dynamic poverty trap model for the first time. We use resilience thinking to inform three diverse trajectories of change (Type I: big-push, Type II: change in behaviour, and Type III: transformation) which we test using multidimensional models applied to different contexts. To define the different ‘contexts’ we build off the review in Paper I by reviewing commonly observed or assumed social-ecological relationships in rural development contexts in more depth, focusing on economic, biophysical, and cultural aspects of poverty. The models show that 1) interventions that ignore nature and culture can reinforce poverty (particularly in agrobiodiverse landscapes), 2) transformative change can instead open new pathways for poverty alleviation, and 3) conventional asset inputs may be effective in other contexts (for example, where resource degradation and poverty are tightly interlinked) (Figure 6).

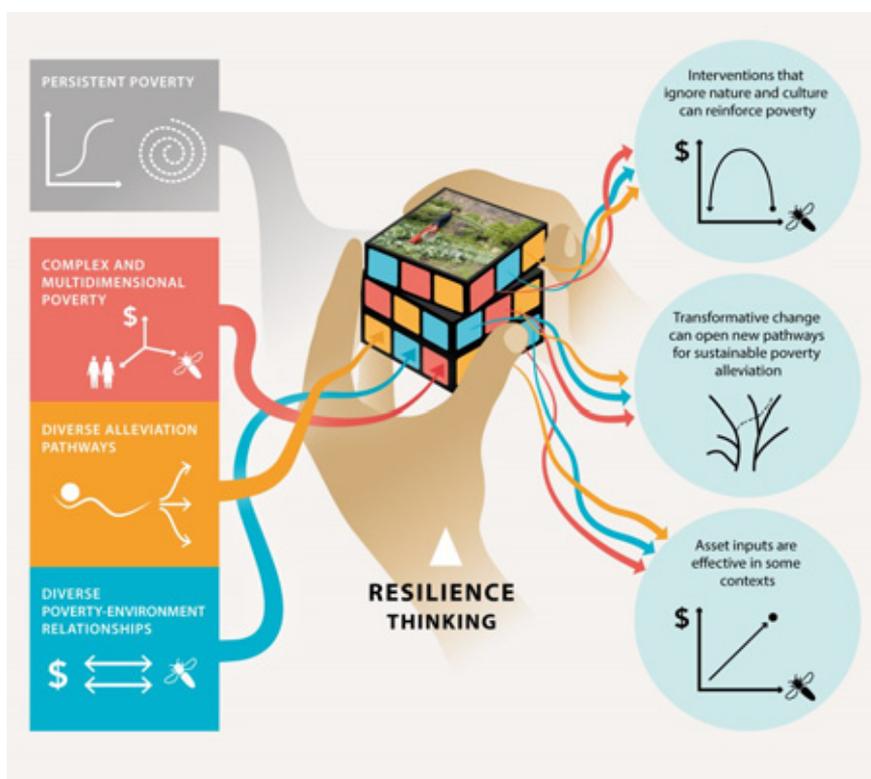


Figure 6. Solving the poverty puzzle. In Paper II, we extend the conventional poverty trap model to include cultural and natural dimensions and model different alleviation pathways across different poverty- environment relationships. The main insights are: interventions that ignore nature and culture can reinforce poverty, transformative change can open new pathways for sustainable poverty alleviation and asset input interventions are effective in some contexts. Papers III and IV build off this foundation to observe effects and responses of big-push style interventions.

## Paper III: Human responses to social-ecological traps

*Summary: Responses to social-ecological traps depend on individual desire, ability, or opportunity, which can either reinforce or dissolve traps.*

Paper III defines social-ecological traps as persistent mismatches between the responses of people, or organisms, and social and ecological conditions that are undesirable from a sustainability perspective. This builds off the ‘cross-scale interactions’ aspects of the traps conceptualisation that is proposed in Paper I. The review of social-ecological literature which features as

Appendix C of Paper I was used to help lay a foundation representing state-of-the-art literature in Paper III. One of the limitations of the social-ecological literature has been the emphasis on a lack of adaptive capacity as a primary causal factor of traps, with comparatively little attention being paid to other causal factors. In Paper III, we address this concern by theorising the variety of human responses to social-ecological traps and the effect of these responses on trap dynamics. Besides (adaptive) capacities, we theorise desires, abilities and opportunities as important additional drivers to explain the diversity of human responses to traps. Using these theoretical concepts, we construct a typology of human responses to social-ecological traps, and illustrate the empirical relevance of the typology through the use of comparative case studies of social-ecological traps: A Swedish Baltic Sea fishery; amaXhosa rural livelihoods; and Pamiri smallholder farming.

The Pamir case defines trap dynamics in the Pamirs as poverty that has become persistent through reinforcing feedbacks between dependence on external interventions, degradation of natural environments (loss of diversity and soil erosion), and emigration. Two types of responses to the traps are identified in the paper. One is ‘resignation’ which describes a desire to change the social-ecological trap but in a situation where there are no employment opportunities, and lacking the ability to farm, people leave to go to Russia and send home remittances. On the other hand, a few farmers have managed to avoid or escape the trap through innovative responses. Generally these are farmers who have been able to tap into the collective memory of knowledge (like Dr. Shirinbek in the opening vignette of this kappa). The innovative response described in this paper is that of a farmer who has created new varieties of apples through grafting old and new varieties together on native rootstock. Paper III offers insights regarding how people respond to traps, and offers a unique sociological conceptualisation of trap dynamics that better accounts for agency.

## Paper IV: Effects of interventions on coevolved practices in biocultural landscapes

*Summary: High input interventions can disrupt coevolutionary relationships, but everyday practice and ritual can be an important source of social-ecological response diversity.*

Paper IV takes a more in-depth look into implications of development interventions, with a focus on a typical Type I ‘big-push’ intervention as identified in Paper II. The paper describes an ancient ritual, which takes place every New Year in the Pamirs, *Nawruz*, to welcome the spring. *Baht*, a fes-

tive porridge, is made from a sweet variety of red wheat, *Rashtak*, which grows only in the high reaches of its most remote valley. We investigate the effects of an introduced wheat seed, which led to the near extinction of *Rashtak*, along with many other traditional seeds and thereby severing millennia-old social-ecological relationships. We examine diverse implications of development interventions on coevolutionary development trajectories of bicultural landscapes specifically through asking 1) what factors gave rise to the intervention and its subsequent failure and 2) what were some of the diverse social and ecological effects of the intervention on biocultural diversity, including differences in the response to the interventions. Successful everyday practices become ritualised, and are the entry point to understanding coevolutionary processes. Through participatory observation in two villages, and specifically engaging in post-harvest practices of food preparation, we describe differential adaptive responses to the introduced seed in the context of larger-scale development efforts in the region.

Our findings provide empirical evidence for the potentially adverse effects of high input interventions on agrobiodiversity. The two communities studied in this paper responded differently to the intervention, with one community maintaining the traditional seed and the other losing it. Our results show that celebration of ritual in both cases acts as a repository of knowledge, values and organisation which fosters social-ecological memory. Finally, the paper shows how interventions not only affect the biophysical dynamics of a landscape but also introduce competing values, knowledges and social organisation.

## Paper V: Early-career perspectives in sustainability science

*Summary: Rigorous sustainability science requires balancing epistemological agility and methodological groundedness.*

The final paper is very different to the previous papers, and serves as a reflection of doing a PhD in sustainability science and the type of scientific processes necessary to work towards integrated sustainability solutions. The paper was motivated by a collective feeling of early-career researchers in sustainability science that we are a new generation of scholars who have already received interdisciplinary – rather than disciplinary - training on entering the PhD phase, and that this background presents both unique challenges and opportunities. Indeed, results from a survey presented in the paper suggest that there is now a distinct generation of sustainability scholars

that start their careers with interdisciplinary training as opposed to first building a strong foundation in a discipline.

Using forum theatre, survey techniques and qualitative analysis of expert elicitation, the paper documents our experience in balancing various ways of knowing with learning in-depth methodologies, and describes our journey in gaining the ability to understand and communicate between different epistemologies. In response to our experience, we propose the undisciplinary journey as an iterative and reflexive process of balancing methodological groundedness and epistemological agility in order to do rigorous sustainability science (Figure 7). ‘Undisciplinary’ describes i) the space or condition of early-career researchers with early interdisciplinary backgrounds, ii) the process of the journey, and iii) the orientation which aids scholars in addressing the complex nature of today’s sustainability challenges.

The process and results of this paper were helpful in advising the ‘Research Approach’ section of this thesis. Moreover, the pluralism and openness to different ways of knowing is essential in how the various contributions of the papers in this thesis are synthesised in order to be useful in furthering research and practice in resilience and development.



Figure 7. The undisciplinary compass (Haider et al. 2017). Point a (lower left quadrant), is characterised by low methodological groundedness and low epistemological agility, resulting in conceptual la-la-land. Point b can be considered a disciplinary attractor, with high methodological groundedness, but low epistemological agility. Point c, on the contrary, is the space one finds oneself in with high awareness of different ways of knowing, but little skill or confidence in methodology. Finally, point d is the space we propose fosters a more rigorous sustainability science. The undisciplinary journey is an iterative process. Image credit: Jerker Lokrantz/Azote

## Discussion – Resilience for development, or development for resilience?

The last decade has witnessed a remarkable surge of interest in the application of resilience *for* development, as the background section of this thesis has laid out. While it may seem strange to put so much emphasis on a mere preposition - '*for*' - this thesis suggests that understanding the ways in which development and resilience are linked is vitally important for conceptualising the relationships between resilience and development. 'Resilience *for* development' implies development as an endpoint, and resilience as a tool to help achieve it. 'Development *for* resilience', on the other hand, reconceptualises development as a process and resilience as the constantly changing capacity to persist, adapt or transform.<sup>16</sup> In this thesis I argue that both perspectives have merit and are not mutually exclusive, but focus much more on the latter.

Resilience is the capacity of a dynamic, constantly changing and coevolving social-ecological state (e.g. a landscape) to persist, adapt or transform in response to change e.g. regarding cultural norms, power relations, or biophysical conditions. What does resilience as 'capacity' in this context actually entail? Building off the main insights of this thesis I propose that resilience as capacity can be usefully interpreted as a filtering process - whether due to social and ecological evolutionary selection processes or intentional choices - to determine, over time, which exogenous and endogenous, social and ecological features are discarded, and which are retained. Changes in social and ecological features, brought about by changes in practice, result, in turn, in changes to development outcomes, helping to shape potentially new development pathways.

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<sup>16</sup> This capacity is an emergent phenomenon from many interactions and constraints. Resilience as a state (or outcome) to be assessed or measured is either a snapshot of the trajectory or a configuration of the system in equilibrium.

# Insights

The four cross-cutting insights of this thesis respond to the knowledge gaps and overarching questions outlined in the beginning of the thesis, and in-so-doing outline what development and resilience as coevolving processes and capacities look like, with implications for research and practice.

Table 2. Development and resilience: Overview of insights in relation to knowledge gaps (KG) and research questions (RQ)

	KG1: Developing an integrated understanding of persistent poverty	KG2: Understanding effects of conventional development strategies in biocultural contexts		
	RQ1: Trap conceptualisations	RQ2: Effects and responses to traps	RQ3: Poverty alleviation potential	RQ4: Science processes
Paper I	Insight A			
Paper II	Insight A		Insight C	
Paper III		Insight B		
Paper IV		Insight B	Insight C	
Paper V				Insight D

The insights of this thesis build on each other (Table 2). Insight A provides a state of the art understanding for why conceptualisations of traps that ignore social-ecological interactions are not effective, and that a broader conceptualisation can better account for the various social-ecological dynamics across a range of different contexts. Insight B shows how observing relationships rather than entities themselves, can uncover not just effects of interventions but also innovative responses. While the first two insights may be more relevant to an exogenous vantage point, the final two emerge from more endogenous perspectives. I use exogenous here to denote ideas that have been introduced from outside of the ‘boundaries’ defining a particular landscape, while endogenous is used in the way put forth by van der Ploeg (1994), as the ability of people to develop themselves within a certain place. Although exogenous and endogenous development are often dichotomised (Holcombe 2014), in reality they are constantly interacting (Lowe et al. 1995), which is highlighted in the final two insights. Insight C emerges from the previous insights, and articulates how the capacity to filter development processes is varyingly reactive and deliberative. The final section of the discussion presents a dialectic of endogenous and exogenous development processes. Insight D cuts across the work of the entire thesis, and the intellectual journey

that its preparation involved, and focuses on the processes of knowledge generation that enabled the other insights to emerge.

**Insight A: Interventions that ignore ecological and cultural dimensions of specific poverty environment relationships can reinforce poverty**

Poverty alleviation strategies are influenced by the ways in which persistent poverty is conceptualised, which varies across research fields (Paper I). The asset-threshold poverty trap framing used in development economics is dominant across research fields, including in sustainability-related publications (Paper I). Yet poverty alleviation strategies focused on overcoming an asset-threshold carry the risk of having adverse effects on natural and cultural capital, and, in turn, the erosion of social-ecological relationships can undermine the effectiveness of poverty alleviation strategies themselves (Paper II). Most economic and theoretical poverty trap models ignore the environment. In Paper II we combine theoretical dynamic models with a review of development assumptions derived from empirical sources to assess the implications of different assumptions on poverty-environment relationships and to illustrate how an intervention that is effective in alleviating poverty in the short-term may fail over time if natural and cultural capital is eroded. When environmental factors are included in poverty trap conceptualisations (e.g. Enfors 2012), the most commonly assumed poverty-environment relationship is that poor people degrade the environment. While this assumption has been challenged multiple times (*reviewed in* Adams et al. 2004) the modelling work in Paper II is the first attempt to provide an explicit consideration of alternative poverty-environment relationships in poverty trap models. A major conclusion from this work is that poverty alleviation needs to be understood as a multi-dimensional process (including more than monetary aspects), as opposed to an end-goal, and that effectiveness of an intervention depends critically on the poverty-environment relationships that are characteristic of a particular place.

Mainstream understanding of poverty is based on assumptions of poverty-environment relationships that may be particularly misleading in areas with high agricultural biodiversity. While there are no silver bullets for shaping more holistic development interventions, neither is it the case that all interventions can be tailored to a specific context. The notion that ‘context matters’ for interventions is not new, but this thesis contributes to *how* it matters. In so doing the thesis illustrates the value of a ‘middle way’ – to contextualize response strategies based on the social-ecological relationships in particular types of cases, ultimately avoiding the blanket strategies that can cause problems in the first place (*refer back to* Figure 1).

## **Insight B: Everyday practices, particularly around food, are sources of resilience and need to be considered in development**

Daily practice and collective social-ecological memory enable a diversity of responses to endogenous or exogenous change. This thesis shows how the explicit recognition of tightly coupled social-ecological relationships, rather than breaking the social and ecological apart into components of a system, can nurture the space for coevolution to continue, creating and recreating different pathways for development. Development interventions need to account for social-ecological relationships rather than what dominant approaches to development or sustainability research see as separate components. Focusing on everyday practice can help overcome this limitation, as practices directly embody complex social-ecological relationships.

Observations of daily practice, such as the growing, harvesting and preparation of food, offer a powerful device for focusing on dynamic social-ecological relationships as the objects of study. This is distinct from a focus on individual social and ecological entities in isolation – such as the productivity of the land or the level of education of the people. The work of Papers III and IV demonstrate how observing practice, particularly around food, can help make tacit knowledge and oppressed ideas more visible. For example, the loss of *Rashtak*, just one of over 150 varieties of wheat in the Pamirs, may not seem like a major loss, but through observing practice, the connections of *Rashtak* to culture, spirituality and social organization become apparent. The wealth of knowledge in how to care for, prepare and celebrate that seed, emerges from the actions of farmers – and particularly women - in their landscapes and in their cultural rituals. Standard development processes may treat ‘seed’ as an input, as a component of a system meant to increase productivity. By observing and actively participating in practice, the focus shifts from seed as an input, to seed as an embodiment of all the relationships that have created and maintained that seed, and the language and culture around it. Interventions should therefore support the relationships, the practices that created and maintain the seed, as opposed to the seed itself as some isolated entity or component.

The relationships between the social (or cultural) and environmental ‘components’ that are often ignored in poverty alleviation schemes are particularly important in biocultural landscapes because it is in these relationships that memory is stored, and novelty and ideas can emerge (Papers III and IV). The sowing, harvesting, storing and preparation of food are examples of practices that have coevolved in and with landscapes over millennia in response to changing environmental and social contexts and needs, and are thus a source of memory and innovation (Berkes et al. 2003). This ability to hold memory and renewal in tension is a core tenet of resilience: the

knowledge and practices that have been accumulated over the past provide the seeds of innovation for the future (Holling 2001).

**Insight C: A process of filtering defines resilience as the capacity to persist, adapt or transform to change**

Environmental and cultural features of a system are abstract entities that do not exist in isolation, but rather in relation to one another and are in constant coevolution. Understanding these relationships as continuously coevolving helps redefine changes in development and resilience as interdependent processes that are varyingly intentional. Moreover, this insight argues that the process of resilience can be usefully conceptualised as a filtering of the old and the new – where the retention or discarding of certain social and ecological elements is in response both to evolutionary pressures (such as climatic conditions, changes in cultural norms) as well as a deliberative process of selection and rejection when confronted by new development opportunities.

Insight B demonstrates the central importance of everyday practices, and the social-ecological memory that they embody, as critical sources of resilience at a local scale. Yet in the contexts of rural poverty and external development interventions, that provide the setting for this thesis, the preservation of memory is not enough to create the conditions for achieving development pathways that foster resilience. Exogenous development interventions (such as the introductions of improved seed varieties or intensified agricultural development practices, described in Paper II) and endogenously derived practices (Papers III, IV) must necessarily go hand-in-hand to foster sustainable development. The way that exogenous and endogenous ideas relate to each other is critical – and at the core of the filtering process I describe in the synthesis section below.

Resilience is often described as a normative outcome or capacity: to build resilience (Berkes et al. 2000; Folke et al. 2002; Berkes et al. 2003; Tompkins and Adger 2004; Olsson et al. 2004; Gaillard 2010). It is commonly employed as such by the international development community (USAID 2016). The insights from this thesis build on this understanding by emphasising that changes in resilience occur via dynamic, constantly changing processes, in which the persistence, adaptation and transformation of different elements is determined through a constant filtering that discards some components and retains others. Viewing resilience as a dynamic outcome of a coevolutionary process, shifts the focus from only understanding what constitutes a desired outcome, to *how* resilience emerges (or ‘becomes’) (Whitehead 1929; Rescher 1996; Dwiartama and Rosin 2014).

In a broad review of resilience, Baggio et al. 2015 find that although resilience has distinct definitions in different research fields, all the definitions relate to “the ability of a system to respond to change while maintaining specific attributes (or functions and controls).” Resilience describes persistence, adaptation and transformation, which may involve individual entities in a system actively keeping ‘old’ customary practices, or ‘adapting’ new practices that socially fit, or finally, mixing old and new, endogenous and exogenous elements in order to create something genuinely new and challenge the status quo.

A farmer and principal of a local school in the Pamirs described this process as important aspect of their Ismaili faith in the following way:

*We should keep any positive things. For example if we don't have bread we can go to our neighbour and get bread. Such positive things are in every culture and we should take the positive things in every culture and not the negative things. If we observe behaviour from the outside that we don't like, then we should avoid it, and if we observe something good, then we should absorb it.*

The words and sentiments of the school principal highlight the normativity of selection, and of guiding development in ‘desirable’ ways. This is akin to Frances Cleaver’s *bricolage*, the weaving together of old and new to make something different. She emphasizes that the ‘something new’ must socially fit, and thereby new institutions form in the ‘necessary improvisation of daily practice’ (Cleaver 2012, pp. 46). The role of power in influencing the practices that are maintained or abandoned must not be ignored.

#### **Insight D: Epistemological agility is vital for developing a rigorous science of sustainability**

The set of papers included in this thesis demonstrate the importance and value of combining multiple epistemologies and methodological approaches to advance scientific understanding of a complex problem and increase its relevance for practice. Epistemological agility and methodological pluralism encourages, if not forces, ontological clashes to be revealed and methodological tensions to be addressed. For example, while papers I and II take a realist approach, and paper II simplifies the complexity of social-ecological relationships to three capitals with contrived and exaggerated assumptions (necessary for analytical clarity), they are intended to speak to a different audience and perform a different role than papers III and IV. In many ways, papers I and II act as a precursor to papers III and IV, in that they establish the state of the art understanding of traps in embedded social-ecological

systems and challenge the status quo of development interventions using established concepts and methods.

In Insight C, it was noted that intervening to enhance resilience necessarily requires ‘choosing’ good aspects to support and negative aspects to remove or challenge, as the school principal articulated. As this thesis demonstrates, academic conceptualisations and framing of development and resilience affect the way interventions are designed and implemented, and include perceptions of what counts as ‘good’ (or methods for identifying what is ‘good’) aspects to support. These will always be contested, hence the deliberative aspect referred to in the previous insight, and therefore it is necessary that these conceptions and ways of knowing are always challenged and viewed from multiple angles. Epistemological agility, or more simply the ability to accept and integrate different ways of knowing, supports reflexive and rigorous academic engagement in a development process. In this way, epistemological agility can be considered analogous to the filtering process, in which old and new, exogenous and endogenous elements are recombined based on both selective pressures and active and deliberative choices.

## Synthesis: Development and resilience pathways

Changes in development and resilience involve highly dynamic, interdependent processes. Therefore, a key step for achieving desirable development or sustainability outcomes is to understand how they interact. I set out an argument at the beginning of this thesis that development needs to be done differently in order to alleviate poverty without compromising biological and cultural diversity. In response to this challenge, the contribution of the individual papers and the thesis overall helps to outline resilience as the capacity of social-ecological relationships (for example as embodied in certain practices) to persist, adapt or transform. One contribution of this thesis is the more detailed conceptualisation of this capacity as a filtering process and how changes in resilience interact with the development process over time, which in turn shapes different development pathways.

The contributions of the individual papers show how the social and ecological are intertwined through context-dependent poverty-environment relationships (Papers II, IV), and are the result of coevolving practices (Papers III, IV) that are shaped by a constant filtering – whether as a background evolutionary or deliberative process – of old and new, social and ecological features across different scales (Paper II and IV). Taken together, the emergent insights of the thesis suggest that to do development differently we should reconceptualise development as a coevolutionary process, where knowledge,

technology, environment, social organisation and values continuously shape and reshape each other, and deepen our understanding of their intertwinedness. Past and present development pathways necessarily shape future pathways. This section builds on Insights A, B and C, to explore more deeply the notion and framing of resilience as the capacity to actively filter new development options and combine old and new elements in a dynamic process of persistence, adaptation and transformation. Nurturing the capacity to actively shape this filtering process offers a new way of practicing development and the chance to improve human livelihoods in ways that do not cause the erosion of the biocultural diversity on which they can so often depend.

Coevolution is in part a passive, evolutionary process, where selective environmental and social factors (such as climatic changes, market influences or certain power relations) impose constraints and opportunities that together help shape changes in practice. Practices are further altered by deliberative processes (choices), where certain endogenous practices are actively maintained – whether in daily life or through ritual – and specific elements of external development interventions are actively accepted or rejected (for example seeds or fertilizers). This combination of passive and active selection and rejection is conceptualised in Figure 8 to demonstrate divergent pathways of development and resilience.

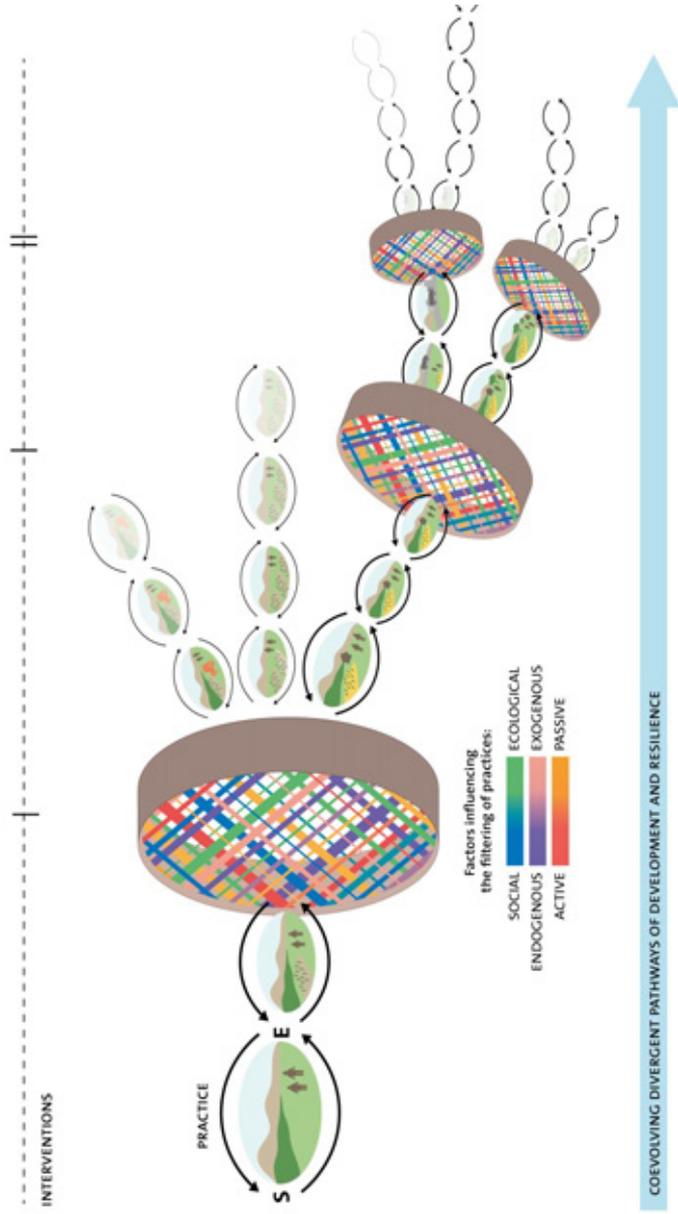


Figure 8. Changes in resilience and development occur via dynamic change processes. Practices offer a powerful lens through which to assess and understand these changes. Practices are filtered by a set of constraints, opportunities and choices defined by myriad factors, ranging from social to ecological, endogenous to exogenous, and active to passive. Each filtering process creates the conditions for new development pathways to emerge. The filters are drawn as traditional *galberr*, used for winnowing grain in the Pamirs (see Paper IV for photograph).

Development processes are conceptualised as the coevolution between social-ecological relationships, and can be observed and interpreted through practice. Practices are defining features of landscapes and offer tangible manifestations of coevolving social-ecological relationships. The way in which practices change over time is determined by the filtering process, which shapes and reshapes the pathways of development of the biocultural landscape. The filtering process is comprised of sets of factors (different colours Figure 8), including active to passive, endogenous to exogenous and social to ecological, which together define the constraints, opportunities and choices that determine ongoing changes to the practices. In other words the filtering process determines which components of existing practices are retained and which new components of practice are lost, accepted or rejected (e.g. in the face of development interventions). The ‘mesh size’ in Figure 8, determining which elements of practice get through or not, is determined by the varying power and agency of the different factors (denoted by the different sizes in the mesh in Figure 8). Figure 8 depicts how the practices change over time, with increased field size for example. Following the first filter, a tractor is introduced which changes the landscapes over a number of seasons but eventually that development pathway fades away, perhaps because, as in the Pamirs, tractors are not well-suited to the steep slopes of the fields. In the lower development pathway a new crop is introduced and some houses are built. The pathway further diverges through a second filter, with the upper pathway showing the results of a road introduced and the lower pathways depicting a more agroecological landscape, with the introduction of some trees.

The different elements that make up the filter exert varying levels of influence on changes in practice. Differences in influence can be linked to hard biophysical constraints, e.g. as related to climate change, or can be linked to differing power dynamics among different actors, where the ideas of powerful development agencies may often have primacy over the ideas that may be buried in the tacit knowledge of local stewards. For example, a development intervention of an improved seed (exogenous factor) aiming to alleviate poverty through increased productivity (social), represents an active filter that could have a profound influence on farming practices, effectively reducing the gaps in the ‘mesh’ through which other ideas are filtered, potentially resulting in the ‘filtering out’ of less powerful ideas, including those borne from local and traditional knowledge.<sup>17</sup> By contrast, a woman in a community growing her own landrace seeds (locally adapted and domesticated) (en-

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<sup>17</sup> Other types of filtering processes could be conceptualised, such as environmental or social shocks, market influences, political changes etc. The focus of this thesis is explicitly on development interventions.

dogenuous) who hopes to provide her children with the opportunity for a healthy life in a safe place where she is free to practice the spiritual and cultural practices she values (social-ecological) also makes many (active) choices, either deliberately or through her tacit practices, but may not have the same influence that a development organisation has to implement her ideas, and the idea may be lost. Understanding changes to development and resilience as coevolving processes that are filtered in this way could help inform development practice through making explicit the process by which resilience (as a dynamic system state) is built or eroded, and by drawing out the practices and associated implicit or tacit knowledge that normally hold less power.

Filtering of changes to development and resilience as a heuristic device requires agility between different ways of doing research and awareness of the power that different ideas and narratives hold. The trajectories emerging from the filter lend themselves to more abstract analytical use (Papers I and II), depicting development as a coevolutionary process between social and ecological aspects that can persist (such as a trap – Insight A), adapt or transform. Using more constructive or interpretive approaches, the social and ecological as separate entities are dissolved, and instead the observation of practice (Insight B) enables the social-ecological relationships to become the focus of inquiry.

The lessons of this thesis have much broader relevance beyond biocultural contexts and across scales, particularly in the context of the Anthropocene.<sup>18</sup> Development in the era of the Anthropocene, where humans are the dominant influence on climate and the environment, needs to be drastically redefined. There has been a recognized shift in focus from treating the environment as an externality in development thinking to considering the biosphere as a precondition for social justice, economic development and sustainability (Folke et al. 2016); thus a healthy biosphere is a prerequisite for development in the Anthropocene.

Not only is all human well-being dependent on the biosphere (Steffen et al. 2015; Folke et al. 2016), but also Earth system processes are in turn influenced by human activity in a relational way, and across local and global scales. For example, seeds from the Pamirs are deemed important for future food security, and are thus conserved *ex situ* in a global seed vault in Svalbard. However, the knowledge, culture and rituals that gave rise to those

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<sup>18</sup> The “Anthropocene” is a new geological epoch in which human activities exert geological influence on Earth, through land use change, deforestation and fossil-fuel burning (Crutzen 2006; Steffen 2007), which remains a disputed concept for some researchers (e.g. Malm and Hornborg 2014).

seeds are not stored in the seed vault. Should the seeds be needed one day, the knowledge on how to cultivate and prepare them may be lost, not to mention the less visible cultural and spiritual values that coevolved with the seeds. These cross-scale social-ecological relationships are encapsulated in the concept of the “biosphere” which ultimately embraces the geological, biological, and human forces that change and determine the face of the Earth (Vernadsky (1926) *as cited in* Ghilarov (1995)). Understanding the biosphere as the life of the Earth’s surface emphasizes the relational dependence of the social and ecological. Viewing the biosphere itself as a collection of relations, the scales of individual-local-regional-global become clearly compatible – linking the local empirical and theoretical questions of this thesis within a global context.

## Implications for research

The thesis set out to improve understanding of how development processes for alleviating poverty could better account for coevolved relationships between people and nature. In pursuing these questions, and building off the insights that have emerged, further research ideas have come to light.

First, building off the contributions from Papers I and II, the broadened conceptualisation of poverty traps in deeply intertwined social-ecological contexts could be extended and applied to other empirical cases. More specifically the poverty cube puzzle (Paper II) could be used as a way to think through different intervention types in different contexts in place based research or practice, or at a strategic level for integrating SDGs and for other types of landscapes or seascapes.

Second, more fundamental questions around the relationships between poverty and biocultural diversity remain unsolved. Such as: Are the conditions that create biological and cultural diversity the same conditions that create or perpetuate poverty? Does development through economic growth necessarily mean a reduction in biocultural diversity? In order to pursue these questions further research could include a spatial study on the overlap between areas of extreme poverty and biocultural diversity in order to prioritise areas for more integrated and holistic analysis. Studies that better address dynamics of persistent feedbacks between poverty and low soil fertility can help inform how agroecological practices can be most effective in transforming situations of persistent poverty and environmental degradation. Resolving these types of questions will require not only more integrated conceptualisations and models but also a general adoption of relational and process philosophies as op-

posed to the interactional philosophy currently dominating a lot of work on social-ecological systems (West et al. 2015).

Further research could deepen the insights of papers III and IV which demonstrated how daily practice can be used as a lens to conceptualise relationships as opposed to individual system components. Further research could investigate the role of daily practice, and particularly the value of reciprocity as a source of social-ecological response diversity, and how daily practice creates novelty and how ideas emerge from people in landscapes (*e.g. building off* Haider and van Oudenhoven 2015).

Finally, the thesis lays the ground for further exciting future research on inter/trans/un-disciplinary science for development and resilience. As a nascent area of research many different concepts are currently used for characterising social-ecological relationships. A synthesis on when different concepts are used for certain purposes, and their benefits and pitfalls, could provide researchers with an overview of the suitability of different concepts and theories for resilience and development research.

## Reflections on the research process

The navigation of this thesis has been aided considerably by the ‘undisciplinary compass’ (Paper V). The undisciplinary compass helps to lay out the current state of understanding of resilience in development. For example, the theory section shows how some research and practice of resilience in development is stuck in a space of “conceptual la-la-land” which suffers from a lack of empirical groundedness, conceptual clarity or rigour in measuring outcomes (Figure 7). The dominant literature on poverty traps is strongly influenced by development economics which offers methodological groundedness in theoretical models and econometric data. In and of itself, this is not problematic. However, as Papers I and II demonstrate, isolated thinking and implementation based on narrowly defined poverty traps can lead to unintended consequences for cultural and biological diversity. On the other side of the spectrum, more critical development theory could be situated along the axis (Figure 7) with higher epistemological agility.

As a personal journey, I came into this PhD already with a diverse education and practical experience. I could, from quite early on, consider myself an inter- and sometimes even a transdisciplinary with no disciplinary home. As the prologue illustrates, the thesis is strongly problem driven and solutions oriented. Throughout this introductory chapter I have tried to be transparent in my navigation of the ontological questions, epistemological ten-

sions, and methodological clashes that arose throughout the work. While a more disciplinary PhD thesis, or a more course-based programme, may have a stronger emphasis on building a theoretical foundation, the most valuable skill I have developed as a PhD candidate has been the navigation of different ways of knowing, and learning how to match different methodologies and styles of research and writing.

I entered the PhD programme with two undergraduate degrees, one in Biology and one in Political Science (deliberately two separate degrees rather than a joint one in an attempt to deepen my disciplinary roots), and a Masters degree in Geography (working with a political ecology research group), along with a number of years of work as a development practitioner. I started my journey as a sustainability science PhD student therefore further along the axis of epistemological agility than methodological groundedness (Figure 7). I certainly ventured into the space of ‘conceptual la-la-land,’ particularly as I tried to make sense of ‘traps.’ My relationship with resilience thinking and all the concepts that come with it have changed over time – starting with an aversion of using jargon-laden concepts to explain rather simple stories or anecdotes from the farmers who I ultimately would like to work for. Coming back to resilience so strongly in my Kappa has been a personal surprise. The theory section specified my approach to resilience in this thesis, and I offer a theoretical contribution in newly conceptualising resilience as capacity in development processes. Many different definitions and conceptualisations of resilience will continue to exist and emerge and so long as they are clearly articulated and rigorously applied (Quinlan et al. 2015), it may serve as a powerful unifying concept to progress towards sustainability.

Epistemological breadth however, can come at the expense of theoretical depth. More disciplinary scholars who read this thesis may critique it for lacking enough theory. Whilst this would be a perfectly valid critique, it can also be framed as a strength rather than a weakness, in that it allows the sustainability science student to avoid a dogmatic approach to research. I chose to engage with concepts and theories that are currently influencing discourse (Bensaude-Vincent 2014; Simon and Randalls 2016). On the one hand, I choose to engage with modernist theories of development (poverty traps) because modernism remains a powerful discourse shaping contemporary development practice. On the other hand, when working with farmers in the Pamirs, I endeavour to reject any *a priori* theoretical framing that may bias my ethnographic observations.

I also ventured of course into the methodological quadrant (Figure 7), starting my PhD with the desire to learn what I perceived to be ‘hard’ skills of modelling, for example. While I soon realized that I found it difficult to

make bold assumptions and implications, I came to respect and learn how to work with modellers and modelling concepts and approaches in a new way (Paper II, for example). This led to some surprising insights. Distancing myself from the critical post-modernist stance on development theory, that ‘big-push’ style interventions are harmful, I was able to concede that a big-push intervention, such as the introduction of improved seeds, will be effective in some contexts. I feel comfortable with that because the assumptions and conditions under which this is true are made so transparent. This type of agility can be powerful from a research impact perspective in that it enables me to engage with power-laden concepts, such as resilience and poverty traps, in a way that does not take these concepts as a given but rather deconstructs and rebuilds them with the nuances that are important to my own positionality.

As evidenced in this thesis, I did not specialize in any one methodology, and in that sense, I do not follow the advice we propose in Paper V. Rather, in pursuing methodological pluralism, I find myself equipped with greater epistemological agility and some methodological groundedness. The skills I acquired or honed are also outlined in paper V including “collaborative interpersonal skills across cultures, between ideologies and working in different contexts. Skills in facilitation, participatory approaches and synthesis (i.e. to see and make sense of ‘the big picture’) are also valuable skills in sustainability science.” Synthesis, is another skill that I have worked on, particularly in the writing of this Kappa. Figure 8 for example (pathways of development and resilience) requires not just synthesis of research results, but also a critical appraisal of the types of questions to ask and how research can lead to valuable societal insights.

## Implications for practice and policy

How might the contributions and insights of this thesis be translated to practice? What does fostering ‘Development *for* Resilience’ entail? While sustainability science has been at the forefront of use-inspired research over the past decade, it remains to be seen how research actually moves beyond the realm of analysis and links knowledge with action (Miller et al. 2014). As a thought exercise, tentative guidelines emerging from this thesis would suggest asking certain questions prior to intervening, such as:

- Is intervention necessary?
- If yes, poverty alleviation strategies should start by critically asking what conceptual models and assumptions are guiding the way persistent poverty is perceived (Paper I);

- How can the context be characterised given the identified problem? E.g. poverty-environment relationships. What might the effects of certain intervention strategies be on nature, and culture? (Paper II);
- A conceptual model like the poverty cube (Paper II) may be helpful for high-level development actors to consider effects of intervention strategies;
- A dynamic systems modelling approach (like the Poverty Cube) may be useful for development actors to think through implications of diverse development trajectories and give space to currently underrepresented pathways of change. Our model-based approach and insights offer a systematic way to review the consequences of the causal mechanisms that characterize poverty traps in different agricultural contexts and identify appropriate strategies for rural development challenges.

But, there are limits to an interventionist approach. Further questions may include:

- What are endogenous ideas for development trajectories, where do they come from? Observation and celebration of practice can help uncover these ideas and give them power (Paper III, IV, F).
- Attention to the diversity in human responses to social-ecological traps may inform future applied research and planned interventions to prevent or dissolve SE traps (Paper III);
- Development for resilience is about creating the space for endogenous and external filtering and *bricolage* to take place;
- Coevolution can help guide approaches to doing development differently. Understanding coevolutionary processes in a landscape may help develop processes for filtering social to ecological, endogenous to exogenous, and active to passive responses to local, regional and global change and empower appropriate development pathways.
- Interventions that aim to preserve certain social-ecological relationships might focus on protecting the practice as opposed to identified ‘components.’ This could enable more holistic and appropriate interventions.

These questions only offer the initial contours of what a more holistic approach to understanding and shaping development interventions in a way that accounts for social and ecological interdependencies might look like.

# Conclusions

This thesis focuses on biocultural landscapes, regions that are home to rich biological and cultural diversity, yet are often poor in monetary terms. Biocultural landscapes bring into sharp focus the challenge of how development can raise living standards without at the same time eroding the biological and cultural diversity on which well-being so often depends. There is much to learn from the human ingenuity that creates and maintains biocultural landscapes, and the observation of practices and rituals provides a powerful lens for assessing how they have been shaped through the coevolution of social and ecological aspects.

The overarching aim of this thesis was to improve understanding of how development processes for alleviating poverty could better account for relationships between people and nature in biocultural contexts. It did this by first reviewing common conceptualisations of persistent poverty in rural contexts (Paper I), and critically investigating the consequences of the assumptions of the common asset-threshold poverty traps model on nature and culture, and the corresponding effects of a degrading environment and culture on poverty alleviation strategies (Paper II). The thesis demonstrates the effects of, and responses to, trap-like situations and development interventions in areas with high biocultural diversity (Papers III, IV). By actively engaging with disparate methodological approaches, and critically appraising the contribution of each (Paper V), I was able to both critique and engage with a wide range of dominant concepts in the development and resilience discourse. With the motivation to better understand how development processes (specifically poverty alleviation) in economically impoverished regions can occur without the concomitant reduction of biocultural diversity, and how biocultural diversity can itself contribute towards improved development pathways, this thesis contributes towards: 1) advancing more integrated conceptualisations of trap dynamics that account for highly coevolved social and ecological systems, 2) demonstrating how the effects of high-input interventions in rural landscapes can have negative effects on nature and culture and potentially reinforce or exacerbate poverty, and 3) a more detailed conceptualisation of resilience as a capacity to filter practices, and how changes in resilience interact with the development process over time to shape different development pathways.

Poverty traps are a common way to conceptualise persistent, undesirable and self-reinforcing situations, but the development economics definition of poverty, as persistence under a given asset threshold, remains dominant in the literature. This narrow conceptualisation of poverty traps, in turn, encourages ‘big-push’ style interventions, which have often had and continue to have negative impacts on nature and culture. Despite its limitations, the poverty trap concept has emerged as a valuable bridging concept at the interface of development and resilience studies. The thesis demonstrates that the concept of traps should not be taken as a given, but can be usefully broadened to bridge between disciplines and to better incorporate the dynamics of social and ecological relationships across scales, and consider external and path-dependent factors. For example, the poverty traps perceived in biocultural landscapes like the Pamirs can be better understood and addressed by taking into account the legacy effects of different governance regimes and the dependency on external actors such as the Soviet regime and development organisations, and their consequences for biocultural diversity. From an external perspective, the dynamical systems model of poverty traps that we developed offers a powerful heuristic device to help development practitioners’ design more integrated and holistic interventions that directly consider natural and cultural dynamics, as well as the importance of context.

From a more endogenous perspective, observing daily practice enables a more holistic understanding of how social and ecological factors coevolve over time, and thus for potentially guiding improvements in development interventions. The thesis documents the impact of a conventional high-input intervention on cultural practices in a diverse biocultural landscape, and the varying responses of individuals and communities when conflicting value systems are introduced through intervention. Participatory observation demonstrates how celebration of daily practice and ritual can offer important sources of social and ecological memory.

The overarching conclusion of the thesis is that biocultural landscapes are examples of highly coevolved systems, where feedbacks and interdependencies between nature and culture result in a constant filtering of practices, that in turn shape changes in the landscape. The thesis explores more deeply the notion and framing of resilience as the capacity to actively filter new development options and combine old and new elements in a dynamic process of persistence, adaptation and transformation. Changes in development and resilience are ongoing and interrelated processes, and understanding these interdependencies and ways to purposefully shape the filtering process is central to the long-term success of sustainable development. Daily practices are a natural entry point for development; practices shape coevolution, which shapes development.

Methodological contributions of this thesis offer valuable insights for other studies in sustainability science. Writing a coherent thesis which draws on epistemological foundations ranging from realism to constructivism and employing methods that vary from dynamical systems modelling to participatory ethnographic research, is not a straight-forward endeavour. The pursuit of some of the most pressing sustainability questions of our time will require both epistemological agility and methodological pluralism - while still maintaining a strong grounding in specific methods - and this thesis provides a reflection of one such research journey. Specific methodological contributions include dynamical systems modelling for poverty traps, the observation of practices to elicit and better understand the nature of co-evolved social-ecological relationships, and participatory observation using cooking and food as a method to evoke tacit knowledge and ideas in contexts where they are usually suppressed. In using these different methods together, I arrived at very different conclusions than I would have if I had used only one method, or one way of knowing.

# Epilogue

Are the Pamirs a landscape of hope, or despair? Of richness or poverty? Are, indeed the Pamirs in a poverty trap? Some would say yes, poverty rates remain high and landscapes continue to be degraded as the region struggles with population growth and an ongoing shift from centralised to privatised land ownership. Yet many people in the region would say no, as despite a lack of opportunities, they consider themselves rich in spirituality and culture and are proud of their clean air and water. Central to understanding these different perspectives is the importance of understanding the tensions that underlie differing visions and values around development interventions in the region.

Whilst the landscapes of the Pamirs have been shaped by their isolation the region has long been at a crossroads of movement between the East and West. Today people leave the Pamirs because of a lack of opportunities to stay; yet many profess that they leave in order to come back – and to live a better life on return. These tensions, between isolation and movement, between a desire to leave and deep-rooted connections to the land, play a profound role in shaping evolving development trajectories in the region.

## **Tensions in development practice**

The prologue reflects my observations of development interventions and tensions in the Pamirs between 2009-2011. As such, this thesis is largely a critique of the problems I saw with high-input ‘big-push’ development interventions that I witnessed at that time. When I returned to the Pamirs in the Spring of 2016, I was curious about whether the discourse and practice of development in the Pamirs had changed. If yes, how was development being done differently?

A preliminary document analysis of project reports from the region during 20 years (between 1997 and 2017), supplemented with qualitative key-informant interviews, suggests that development has indeed shifted from a largely humanitarian response in the 1990s and early 2000s, to service provision and facilitation in the late 2000s, and since 2011 a focus on participatory governance. Since 2015 there has been an emerging focus on a ‘positive deviance approach,’ which aims to identify and foster positive agricultural

practices in communities. The positive deviance approach was introduced by a donor (active in the region since 2008), whose mandate is to “back the stewards of biocultural diversity.”

Despite this shift to acknowledging local knowledge and practice, the majority of donors continue to invest in conventional development practices of market and infrastructure development, and a focus on high levels of agricultural inputs. In general, there remains a dominant belief that exogenous interventions are not only necessary but are also the key to improving development outcomes in the region:

*...the development process consists of different thinking patterns. These patterns come from experience and many lessons learnt. People who come from the outside, they have their Western thinking patterns. This is what the locals, when they are brought to a [development] organization, they have to be trained in these patterns. Without that, the locals cannot do anything. Otherwise they would bring their local patterns of thinking to the organization and that wouldn't work, because you know, that's why we're developing nations and that's why we are in a difficult situation.*

(NGO official in the Pamirs, May 2016).

### **Tensions in values**

The biggest tension in the Pamirs I observe today is the difference in values between farmers in rural communities and development organisations implementing programmes. Such differences are of profound importance as values lie at the heart of our ability to imagine different futures. To get at the core of this tension, I led visioning exercises with different actors in the Pamirs in June 2016 (Figure 9).



Figure 9. Visions for a Pamiri future as imagined by: A) non-governmental organisation of the region; B) farmers from Ishkashim valley; C) farmers from Gund valley; and D) farmers Bartang valley. Paintings by: Yorali Berdov

Over a number of days we invited farmers from all over the Pamirs to come together in Baroj village and invited them to bring products unique from their village or valley and to prepare a meal that they were proud of. The different groups (A to D) discussed what a ‘good life’ in the Pamirs would look like, and a local artist listened to the conversations and produced water-colour paintings to capture their visions. Panel A (Figure 9) is the vision of the main non-governmental organisation in the region, and depicts an ‘Enterprise Growth Accelerator’ which is set up to promote growth of local businesses and increase tourism activities such as hiking, kite-surfing on a lake, as well as photography. Connectivity to the region has increased with the “Pamir Express” bus on an improved road, an international airport and an international university. Most of these activities are already ongoing development projects in the region so the focus of the vision is on accelerating a mainstream development pathway.

At the other extreme, Panel B (Figure 9) depicts a vision for food sovereignty in the context of a changing climate. Local products are sold at a small local shop and few imports are necessary. There is an increase in intergenerational knowledge exchange and respect for traditions and rituals, represented by two adults and a child sitting in a spiritual place between offerings and a sun calendar. In the background one can see that clouds which represent the changing climate, and people are up on the hillside collecting wild foods in order to compensate for the losses in crop productivity due to climatic changes. There is an increase in rainfed agriculture, particularly fodder crops, in the land above the irrigation channel. The irrigation channel itself is maintained through *hashar*, collective work around irrigation.

Panels C and D (Figure 9) are different to the first two, in that they combine old and new elements. At the forefront, they both value local, traditional and nutritious food, sharing, and respect for each other. In Panel C, a table of traditional Pamiri food is laid at a local restaurant – in this vision, money can be made from celebrating local food and culture. A food truck transports local food products, particularly milk products between different valleys, and a factory is featured to help preserve food products. More land is being used, and small tractors are available which are able to work on small plots of land and steep slopes. A cultural centre and hospital have been built to enhance well-being. In Panel D, besides trust and hospitality for each other, the vision focuses on having better access to regional markets through roads, as well as better and more reliable access to electricity. A hydropower station has been built in this vision in order to not only provide electricity for themselves but also to sell excess power to other regions of Central Asia, including Afghanistan. A marble factory is proposed in order to generate jobs and an income source from a raw material that exists in abundance in the valley and has yet

to be exploited. When asked how Visions C and D would be achieved, the response from both communities was to appeal to the non-governmental organisation for funding. Future steps beyond visioning would involve pathways and scenario mapping, to breakdown the process of achieving the visions into concrete steps.

The tensions between sharing and profit-making lie at the centre of conflicting narratives for the future of the Pamirs. When preparing food and celebrating culture, most people say that the most important thing for them is sharing, hospitality and trust and openness. Yet development organisations say that this same culture of sharing is also the biggest single barrier to development: that people are not business-minded enough. A member of an NGO told me:

*A lot of the values that we had, we are losing. Sometimes I am very sad that we have lost them, but we have to keep up with the times and we cannot keep them. When I was [REDACTED], we gave food to everyone. People were sharing the food, the food aid that we brought. I was very upset. I did the monitoring myself. I asked an old lady, I gave her 50kg of flour one day, and the next day she had 3kg. I asked her what happened to all the flour? And she said she used it all for baking. I said, I am Pamiri, I know how much flour you would need to bake things, and it's not this much.*

*She said, "should I be honest with you and you will not be upset with me? Do you promise not to punish me or my neighbours? She said, I am thankful to you...to everyone for supporting me. But most important for me is to keep my relation with my neighbours. Everyday they are always sharing meat, and things with me, they are always open with me. Today if I get 50 kg, I must share with them. For me it is better to share this flour with them. If everyone will die of hunger, I will also die. If they are survive, I am also surviving."*

*In the past, nobody was selling any meat or fruit. Today people do sell. This has changed, and this is sad. Today you must have an income source. Sometimes with development we are damaging the good culture that was there, when we are pushing entrepreneurship etc. we are damaging peoples minds. The GBAO [the Pamirs] I knew 30 or 40 years ago its not anymore those people, it's not the same. Before it was much much better. Now we started to lose the good ways of thinking, with business. It was not part of our culture, not part of our faith. Whether we like it, or not, there are no other way to survive.*

(NGO official in Dushanbe, June 2016).

## **The future of Pamirs**

In attempting to rethink how we conceptualise poverty and intervention in biocultural landscapes such as the Pamirs I am still left with the question of whether such conflicting values, between a sharing economy and profit-seeking activities, can be reconciled in forging new and sustainable development pathways? The answer is far from clear but if such a reconciliation is possible it requires a marked departure from the thinking that has underpinned decades of conventional development practice. Hopefully the insights of this thesis, particularly around the focus on coevolving development and resilience pathways as a process of filtering and recombining both old and new elements and practices, can help guide more contextually appropriate and effective development interventions in biocultural landscapes. Development interventions to alleviate poverty must explicitly consider the complex relationships between nature and culture and give space for novelty to arise from everyday practices – and in so doing allow diverse responses to emerge as sources of resilience, where both endogenous and exogenous elements are combined in ways that benefit from both centuries-old, locally adapted practices as well as ideas and innovations that are brought in from outside. A failure to do this will result in the ongoing erosion of the biological and cultural diversity that makes the Pamirs so unique, and may yet be vital to its future development.

# Acknowledgements

The research for this thesis was primarily funded by the European Research Council under the European Union's Seventh Framework Programme (FP/2007-2013)/ERC Grant Agreement 283950 SES-LINK. Additionally, support was received from the FORMAS project grant (NO. 2008-1283) "Modelling interactions among multiple ecosystem services in human dominated landscapes" and by FORMAS project grant (NO. 2013-1293) "Working knowledge in Swedish coastal fishery – Making cultural capital visible for sustainable use of sea—and landscapes." MISTRA supported this PhD thesis through a core grant to the Stockholm Resilience Centre.

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# Thank you



**Tabak (Tajik):** *large deep wooden plate, usually made of walnut, apricot or mulberry wood. Food is served on these plates and people eat from them together. Neighbourhoods or communities within Pamiri villages are also called tabak, that is, 'shared plate'. This signifies the role of community in binding people together, through both good times and bad.*

Just like this Pamiri saying, this work could not have been completed without the support (and generosity) of the people around me. Thank you to everyone who has supported me, not just through this PhD, but also in all the steps that led me here.

Maja, I have enjoyed sharing with you a passion for an otherwise forgotten region of the world, and a desire to understand the phenomena that we independently observed in it, and coming together to test concepts and build little theories that will hopefully lead to deepening understanding of the problems we seek to improve. Thank you for giving me this opportunity, and your patience in finding the right way to work together, in light of our differences! And thanks for teaching me so much about working across methodologies and with a group of very different researchers. It's this type of 'slow research' that I think has helped foster some of our more novel insights. Thank you Wijnand for your trust, and giving space for ideas to grow. Garry, thank you for being excited about many of these ideas from the very beginning of this thesis and for exploring them together. Calle, I hugely valued your regular check-ins, the encouragement and inspiration, which along the way has helped give me much more confidence in my ideas whilst also opening up new pathways to explore.

The institution in which I have done my PhD is truly formidable. All the different ‘pieces’ work together to create strong and deep relationships! Thank you to the education team, particularly Lisa and Garry; the incredible administration team, especially Cecilia, Hanna and Thérèse; the absolutely stellar communications team who have helped communicate my research along the way and from whom I have learnt so much; the SES-LINK team and of course our PhD cohort.

Especially to the crew with whom I shared these steps: Caroline, Daniel, Diego, Emilie, Hanna, Johan, Liz, Maike, Matteo, Megan, Pat, Simon, Vanessa - it was infinitely more fun with all of you! Our over-zealous endeavours and keenness to change the world... The SRC creates a unique atmosphere and space for these ideas to emerge. Such a dynamic space creates opportunities as well as challenges, and I could not be more grateful for the amazing cohort with whom I could explore some of these tensions – which together have created the opportunity not just for academic advancements but also for deep and lasting friendships. Undisciplinarians: this journey has been fun and I’m excited about all the collaborations in years to come. Steve, thanks for your deep collaboration on Paper II. I so greatly enjoyed our many meetings in which we somehow found a way to really ‘see the world’ as one, as opposed to two complementary perspectives. I look forward very much to more work together!

In the final stages of writing, thank you Sarah, Tim, Andrew, Caroline, Simon, Steve, and Belinda and Andrea in discussing the synthesis figure, and of course Maja and Wijnand; your constructively critical eyes significantly improved the Kappa and my attempts to bind together so many disparate strands. Caroline and Toby, your support in the final weeks was instrumental in proofreading, formatting, and generally keeping me sane! And Diego, thank you for the last-minute design help. I am so happy to share the abstract in Swedish, Tajik and German – Thank you Eva, Stefan and Lutfiya for broadening the reach of the thesis in this way.

A number of professional networks have been really important to me in the past 5 years and have each played their own role in helping complete this thesis. I had the wonderful fortune to work part-time with SwedBio, from which I have learnt so much. Sara, Pernilla and Maria, thank you for being such positive role models. I am grateful to have met and worked with the Agricultural Biodiversity community. Sarah D – soulsister- for my introduction to you I shall always be thankful! Balaton Group - our meetings on the lake, the four I attended during my PhD, were always boosts of energy and inspiration. This group more than any other taught me how to balance heart, head and hands. My years on the steering committee were also a rich learning experience for me.

Although I spent most of the five years of this PhD in Stockholm, a part of me was always in the Pamirs. Anzurat, a force of nature, interpreter, ethnobotanist, guide, thank you for being my eyes and ears in the mountains and following-up with all manner of issues. Thank you to you and your family for your hospitality. Lutfiya, thank you for your friendship and support through these years. Gulnora, Molima Latofat and Molim Sarkori for your hospitality and passion, and for giving me hope that there is a positive future for the Pamirs. Of course to my Pamiri family (Eva, Bastiaan and your tribe, Stéphane, Lisa, Sofia, Beth) our shared experiences are always close to my heart. To the entire team at MSDSP and AKF-T, thank you for receiving me again and again and engaging in these tricky questions of development and resilience that lie at the heart of the vital work you do everyday. I look forward to future collaborations and learnings. Thank you to Sijonj, Ravmed and Baroj for hosting us and sharing a part of yourselves.

A PhD is full of ups and downs, rejections and acceptances. In the past five years, I feel I have not just learnt skills and how to write papers, but also how to balance emotions with analytics, feeling with objectivity; in short, how to be a ‘human’ in science. Emotion can be a strength and I have learnt better how to wear it as a researcher. Thank you to all the people, particularly the women (you know who you are!), who have shown me that.

No matter how hard we try to separate ‘work’ from ‘life’ they are deeply intertwined. For me, along with the sheer beauty of the Pamirs, or a calm day on Kottlasjön where we live, or skiing through Northern Sweden, it is the pursuit of the type of questions in this thesis and the human dimensions at their core that “set my soul on fire and makes me come alive” (as Howard Thurman said). Lessons in life have taught me how to be a better researcher, and vice versa. During the time of this PhD I also suffered significant personal challenges. Thank you to everyone for supporting me through those days, months and years - I felt loved. Thank you for sending flowers and cards and recipes for procrastinating, I’m incredibly grateful. Thank you for that.

Lifelong friendships have emerged for which I am immensely thankful. Caroline, you’ve become like a sister! Almost from the beginning of this, five years ago, I felt that we could communicate our daily turbulences with even few words. I’ve been constantly inspired by your thoughtful attention to detail whilst always still seeing the big picture, with your characteristic dedication and determination. Nanda, thank you for being the best and most thoughtful office-mate and friend I could have wished for in the past years – I have learnt so much from you on positive-outlook and a different way of seeing the world. Thank you also for the creative thinking around poverty traps at the beginning of my PhD, I’m looking forward to continuing to think

together! Vivi – I have learnt that I can always turn to you for your solid wisdom and calm. Early on in our friendship I learnt from you, that “where you are right now, is where you are meant to be.”

I came to Sweden for work, but it became a home. In part through all the outdoor activities we love, skiing, skating, kayaking. But mostly through friendships. Thank you to Gurly for creating a home away from home, especially during holidays, our Lidingö family (Nanda, Frithjof & Leo, Caroline & Daniel), Elise & Aaron and Magnus & Rebekka and your delightful little crew, Tim & Bea with Felix & Tasmin for your adventures; thank you all for creating a sense of place here. Thank you Andrew of your thoughtfulness and support these past years, and Vanessa and Gavin, Hanna and Hamidou for your friendship and sharing of life events. It has all meant so much to me.

And of course old friends too. Allison in particular, thank you for our almost-daily correspondence and unfailing support, through which you have witnessed every step of this PhD journey! Frederik: Even if we did not collaborate or even explicitly discuss many of the ideas in this thesis, my thinking has been greatly influenced by our time together and the many conversations we have shared. And the questions of this thesis stem from our fateful meeting in the Pamirs more than eight years ago. My writing has been deeply enriched through our friendship. I know I fall into lazy academic-speak far too often, forgive me. Better than development report-speak though? After the book writing was done, I suffered from a period of ‘separation’ while I found my own voice again. Thank you for the inspiration and our intellectual partnership.

Danke Familie. Thank you Family.

Emma, Sam, Natalie & Aulay for welcoming me in the Fam-Jam! And to Morven, Angus, Aurelia, Cora, India, Eilidh & Ishbel for your patience with me on recent family holidays.

Jo, your uplifting letters and words of steadfast encouragement, support and interest in my work has meant a lot to me. Thank you for your intrinsic understanding, compassion and empathy.

Großmutter, danke für deine Inspiration und die Liebe zum Lernen, die du mir früh mit auf den Weg gegeben hast. Ich wünschte du wärst hier, um diese Doktorarbeit zu empfangen und mich zu sehen - wie damals an meinem ersten Schultag. Omi und Opi, danke für eure bedingungslose Liebe und Unterstützung. Margrit, ich danke Dir und deiner Familie für eure großzügige Unterstützung und Positivität. Stefan und Beatrix, ihr seid immer

interessiert in meine Arbeit und so engagiert. Stefan, danke dir auch fürs sorgsame Lesen meiner Papiere und deine so guten Fragen, die mich immer dazu angehalten haben, weiter zu denken!

Es bereitet mir sehr viel Freude und ein wohltuendes Gefühl von Stabilität, dass ich mich immer bei euch allen in Österreich wie zu Hause fühlen kann.

To Mama and Papa for encouraging me to dance to the songs in my heart, and speak with the rhythm of my heart...

Mom, you've always believed in me unconditionally. You are my biggest model: your strength, sense of adventure, emotional intelligence, perseverance, and compassion are astonishing. Through you, I have learnt how to follow my own moral compass.

Emanuel, the past few years have brought us together and look at how we've grown. I couldn't have overcome the challenges we faced in the past years without you.

Papa, I started this journey with you, and you are still with me at the end even though your presence has changed. Thank you for teaching me to see things I did not think I could see. I thought of you every time I started a sentence with an empty opener, and your cynical humour appears in some of the pages here. Thanks for the odd professor tips like keeping Nutella in desk drawers for energy boosts. Even when we disagreed, I learnt a lot in navigating that space of tension. I think you would be proud of my journey. I dedicated my undergraduate thesis to you, thanking you for being the mirror of my thoughts. You still are, and always will be. I miss you everyday, particularly when I'm looking for a reflection.

Toby, these past five years during my PhD can be characterised by many words, but the one I think of most is love. Thank you for coming with me to Sweden and for creating a life here together. Thank you for your excitement and passion about my work, questions, and ideas. When I no longer see where they are going, you help give them direction. In the past five years we have experienced the depths of sorrow but also the most incredible happiness. You are my partner in every possible way. I look forward to a lifetime of continued exploring and marvelling at this beautiful world with you.

